TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

IINA TURJA

ANALYZING THE RELATIONSHIP BETWEEN PERFORMANCE MEASUREMENT SYSTEMS AND ORGANIZATIONAL LEARNING

Master of Science Thesis

Prof. Petri Suomala and D.Sc. Sanna Hilden have been appointed as the examiners at the Council Meeting of the Faculty of Business and Technology Management on February 5th 2014.

TIIVISTELMÄ

TAMPEREEN TEKNILLINEN YLIOPISTO
Tuotantotalouden koulutusohjelma
TURJA, IINA: Analyysi suorituksenmittausjärjestelmien ja organisatorisen oppimisen välisestä suhteesta
Diplomityö, 95 sivua
Maaliskuu 2014
Pääaine: Teollisuustalous
Tarkastajat: professori Petri Suomala ja tekniikan tohtori Sanna Hilden
Avainsanat: suorituksenmittausjärjestelmä, oppiminen, kirjallisuustutkimus

Tutkimuksessa kyky jatkuvaan oppimiseen on tunnistettu erääksi arvokkaimmista ja kestävimmistä kilpailuedun lähteistä, jonka organisaatio voi saavuttaa. Laaja yksimielisyys vallitsee siitä, että johdon hallintajärjestelmät, etenkin suorituksenmittausjärjestelmät (performance measurement systems, PMS), voivat olla kriittisessä roolissa organisatorisessa oppimisessa. Yhteisymmärrystä suhteen luonteesta – positiivinen vai negatiivinen, medioiva vai moderoiva – ei kuitenkaan ole vielä saavutettu. Tässä diplomityössä analysoidaan PMS:n ja organisatorisen oppimisen välisiä yhteyksiä ja vuorovaikutuksia aihekirjallisuuden pohjalta. Tutkimuksen päätavoite on selkeyttää, kuinka PMS:n ja organisatorisen oppimisen välinen suhde on määritelty ja selitetty tämänhetkisessä akateemisessa kirjallisuudessa.

Diplomityö on toteutettu kriittisenä kirjallisuustutkimuksena, jonka lähdemateriaalina on käytetty laajalti alan akateemisia artikkeleita ja kirjoja. Tutkimus jakautuu neljään osaan. Kahdessa ensimmäisessä osassa tiivistetään oppimisen ja PMS:n teorian tärkeimmät osa-alueet. Kolmannessa osassa kartoitetaan aihekirjallisuutta ja ryhmitellään siitä tunnistettavat erilaiset näkemykset PMS:n ja organisatorisen oppimisen välisestä suhteesta. Lopuksi analysoidaan relevantti kirjallisuus käyttäen viitekehystä, joka on laadittu pohjautuen aikaisemmissa luvuissa tunnistettuihin PMS:n ja oppimisen tärkeimpiin dimensioihin.

Tulokset osoittavat, että PMS voi toimia tärkeänä organisatorisen oppimisen lähteenä ja tehostajana. Nämä oppimisvaikutukset eivät kuitenkaan juonnu automaattisesti PMS:n käyttöönotosta. Järjestelmää on käytettävä interaktiivisella ja osallistavalla tavalla rakentavaa keskustelua tukien – ei ainoastaan seurannan ja kontrollin välineenä, kuten perinteisiä diagnostisia suorituksenmittausjärjestelmiä on totuttu käyttämään. Organisatorisen oppimisen ja suorituksenmittausjärjestelmät yhdistävässä tutkimuksessa on myös tärkeää ulottaa tarkastelu samanaikaisesti molempiin oppimisen ydinulottuvuuksiin – tasoon (yhden ja kahden silmukan oppiminen) sekä toimijaan (yksilö ja yhteisö). Tutkimusalan erimielisyyksistä huolimatta enemmistö katsoo, että luovasti käytettynä PMS ei tukahduta oppimista, vaan järjestelmä voidaan valjastaa tukemaan sitä. Ristiriitaiset mielipiteet PMS:n ja organisatorisen oppimisen suhteen laadusta vaikuttaisivat johtuvan ensisijaisesti käsitteiden määrittelyä koskevasta yksimielisyyden puutteesta.

ABSTRACT

TAMPERE UNIVERSITY OF TECHNOLOGY
Master's Degree Programme in Industrial Engineering and Management
TURJA, IINA: Analyzing the relationship between performance measurement systems and organizational learning
Master of Science Thesis, 95 pages
March 2014
Major: Industrial Economy
Examiner: Professor Petri Suomala and Doctor of Science Sanna Hilden
Keywords: Performance measurement systems (PMS), learning, literature study

Organizational capability of continuous learning has been identified as one of the most valuable and sustainable competitive advantages by several researchers. A broad consensus prevails that management control systems, particularly performance measurement systems, can play a critical role in organizational learning – however, whether this relationship is positive or negative, mediating or moderating, is still open to discussion. This thesis analyzes linkages between performance measurement systems (PMS) and organizational learning as proposed by the literature. The main objective is to clarify how the relationship between PMS and organizational learning is defined and explained in the current body of academic literature.

The thesis is conducted as a critical literature analysis using a broad range of academic articles and books of the field. The study is organized in four parts. In the first two parts the key issues of organizational learning and performance measurement systems are summarized. In the third part maps the literature based on how they describe the relationship between the two constructs. Finally, the relevant literature is analyzed through a framework built upon the key dimensions of PMS and organizational learning identified in the previous chapters.

The results show that PMS can act as a powerful source and facilitator of organizational learning. However, the learning effects are not automatic, but PMS must be used in an interactive, participative fashion surrounded by collective dialogue and debate, as opposed to the traditional diagnostic style of using PMS strictly for monitoring and control purposes. When studying organizational learning in relation with PMS, it is also important to consider the learning construct by taking into account both of its key dimensions – the level of learning (single and double-loop) as well as the actor of learning (individual and collective). Even though the literature contains a range of opinions both for and against a positive relationship between the two constructs, the consensus is that a creative use of PMS is not a hindrance to learning, but can be harnessed to foster it. The disagreement about the relationship appears to mostly stem from the lack of uniformity regarding organizational learning and PMS definitions.

PREFACE

When I first entered the gates of Lapua elementary school in 1996 wearing a rose-printed jacket made by my mother, my dream was to become an archaeologist when I grow up. Today, when adding the final touch to my Master of Science Thesis, I have to apologize to my childhood self for not realizing her dream. However, if I had the chance to meet her, I would console her by telling that she will have the most fantastic years awaiting her in Tampere University of Technology. At the day of my graduation, I will be proud of my career choice, confident with the abundance I have learnt over these years, grateful for all the inspiring people I have met, and excited about taking the next steps in my life.

Writing this thesis has been a challenging effort, which would not have been possible without the help and support I received from so many people. First of all, I want to express my deepest gratitude for the advisors of my thesis, Prof. Petri Suomala and D.Sc. Sanna Hilden. Their comments and feedback have been indispensable, pushing my thinking and guiding my way forward. They also helped me in organizing the financing for my work. I also want to thank the foundation of Yrjö and Senja Koivunen for supporting my work financially. I am grateful to my dearest friends who have made my day so many times during the writing process as well as the unforgettable years in Tampere. They know how to cheer me up and how to get my thoughts off the work when it is much needed, and there has always been room for me on their couch to sleep on while visiting Tampere. Importantly, I want to thank my parents. They have never required anything from me, never pushed me to study harder or expected me to succeed, but their love, care and support have followed me throughout my studying career. Finally, I thank my love and my favorite person in the world, Pyry. For everything.

Helsinki, February 17th 2014

Iina Turja

TABLE OF CONTENTS

1 Introduction 1
1.1 Research objectives 2
1.2 Methodology and structure of the study 3
2 Learning in organizations 5
2.1 Orientations of learning 5
2.2 Learning in organizational context 8
2.3 The two levels of learning 12
2.3.1 Single-loop learning 13
2.3.2 Double-loop learning 15
2.4 Relationship between individual and organizational learning 18
2.4.1 Role of dialogue in organizational learning 20
2.4.2 The organizational learning cycle 22
2.4.3 Obstacles for learning 26
2.4.4 Feedback – a strategic mechanism linking PMS and learning 28
2.5 Dimensions of organizational learning – a framework 30
3 Performance measurement systems 32
3.1 Traditional PMS 33
3.2 Features of contemporary PMS 35
3.3 Consequences of performance measurement 43
3.3.1 People's behavior 43
3.3.2 Organizational capabilities 49
3.3.3 Performance 53
3.4 Types of PMS usage and their relation to learning 55
3.5 PMS and learning – completing the framework 58
4 The relationship between PMS and organizational learning 61
4.1 Negative PMS effects on organizational learning 62
4.2 Positive PMS effects on organizational learning 64
4.2.1 PMS use enables and creates organizational learning 64
4.2.2 Does PMS create single or double-loop learning? 67
4.3 PMS balances organizational learning and control 71
4.4 PMS is irrelevant for organizational learning 72
5 Discussion 74
5.1 Mapping of the focus areas of the existing research 75
5.1.1 Actor of learning 76
5.1.2 Level and underlying theory of learning 78
5.1.3 Style of PMS use 82
5.2 Conclusion and areas for future research 84
References 89

1 INTRODUCTION

Learning as a research topic has been approached broadly from various disciplinary perspectives, such as psychology, sociology, production management, strategy, management science and cultural anthropology (Easterby-Smith 1997). In an organizational context, the research is also highly fragmented, reflecting the lack of consensus about the very nature of the phenomenon as well as the variety of contextual environments it is applied to. What can be pointed out as a common feature, there is a wide consensus about the importance of learning for organizational change and development, as well as in building a sustainable competitive advantage (e.g. Feurer & Chaharbaghi 1995b; Teece 1998).

Many managers agree with the common phrases "what gets measured gets done" and "to manage effectively, you must control – to control consistently, you must measure" (Feurer & Chaharbaghi 1995a; Dervitsiotis 2004, after Riggs 1983). This thinking has been the starting point for performance measurement, which is usually performed through performance measurement systems (PMS). A variety of tools, models and frameworks have been created for the purpose, to function as a component of the management control systems toolbox. Indeed, traditionally the monitoring and control function has been the main purpose of adopting a PMS, so that managers could use them to keep on planned track in strategy implementation. However, as the requirements for organizations to survive in today's turbulent, continuously changing competitive environment have tightened, the PMS are expected to change in synchrony with the changes of the environment. They are now facing the challenge to not only assist in strategy implementation, but to facilitate strategic planning and strategy formulation, which must be flexible and dynamically adaptable to match the organizational and environmental needs (Feurer & Chaharbaghi 1995b; Ferreira & Otley 2009; Oliver 2009).

Strategy formulation is not a process of conception, it is continuously learning and improving the organization's capability to adapt to the prevailing conditions and capture emerging opportunities in the environment (Feurer & Chaharbaghi 1995a; 1995b). Instead of a traditional stiff control device, PMS should be a strategic tool facilitating the continuous organizational learning to be able to identify potential threats and opportunities in the rapidly-changing competitive situations. This need for a new role of PMS is widely recognized in the PMS literature, and some researchers (e.g. Henri 2006a) have already identified the importance of focusing the research efforts on the PMS-learning relationship in particular. This dynamic relationship is in the core of this study.

Though much discussed, the relationship of PMS and learning continues to evoke argument, and consensus about the issue has not yet been reached. It is even open to debate whether the PMS has a positive or negative impact on organizational learning, or whether the relationship is complex and context-dependent, and thus not easily defined. It seems clear, though, that through its information provision and processing capabilities, PMS can have a critical role in organizational learning.

Both organizational learning and PMS are complex and multifaceted constructs involving many important dimensions. Particularly, there is a considerable lack of studies integrating all the perspectives together for a full picture of their relationship. The complex phenomenon is often broken into smaller, more easily digestible pieces to simplify the analysis, but coupled with vague definitions this may distort and give a wrong impression of it in return. Especially, the two levels of learning (single and double-loop) and the learning transfer process from individuals to the organization are in the core of organizational learning; however, they are rarely integrated in the context of PMS-learning relationship.

1.1 Research objectives

The objective of the study is to examine and clarify the linkages between performance measurement systems and learning as presented in the academic literature. Specifically, this study strives to understand whether learning is simply presented as a logical outcome of using PMS, or whether their relationship is more multi-faceted and learning also plays different roles in performance management via the relationship to PMS. It has also been questioned, whether PMS for learning is rather a hindrance than help. The main research question is:

> *How is the relationship between organizational learning and performance measurement systems defined and explained in the current body of academic literature about PMS effects and organizational learning?*

It can be subdivided into the following sub-objectives:

1. *Is learning an outcome of PMS or does it have additional roles in their relationship?*
2. *What types of learning outcomes are pursued with the use of PMS?*
3. *What are the areas that are left unexplored in the relationship between learning and PMS?*

The existing research on both learning and PMS is characterized by abundance of knowledge, fragmentation and lack of consensus regarding many of the important defi-

nitions – all causing confusion in the field. Hence, it is essential to limit the scope of the study to avoid losing track. Knowledge, though tightly linked to learning, is not examined in this study despite where learning emerges as knowledge processing. Knowledge management is a vast and independently developed field of its own, and delving too deep into it would cause distraction from the research objectives. Another concept close to organizational learning, the learning organization, is not in the focus of the study, as it takes a normative approach describing the ideal situation, while this study focuses on examining the processes of organizational learning in a descriptive manner. Finally, there is an abundance of research on PMS and different proposed models for it, and it makes no sense for this study to examine the various features of PMS in detail. Therefore, an introduction to PMS theory is provided, but the emphasis is put on the outcomes and consequences of PMS in organizations.

1.2 Methodology and structure of the study

The study is carried out as a critical literature review, where the current body of knowledge is analyzed, while trying to identify gaps and development areas for future research. The source material consists of books and academic articles of the fields of organizational learning, management control systems and performance measurement. The information search was conducted using primarily the research databases Elsevier, Emerald and EBSCOHost as well as the search engine Google Scholar. Then, the resulting articles and their references were also scanned for further relevant sources. The articles represent well-established publications like the Management Accounting Research, Accounting Organizations and Society, and International Journal of Operations & Production Management. The search terms utilized in the literature search as well as the number of resulting sources are listed in Table 1. Understandably, there was some degree of overlap in the search results, but only unique sources are included in the numbers without double-counting.

Table 1. Search terms and the resulting sources used in this study.

Search terms	# Sources
organizational learning	10
performance measurement system	15
management control system	2
organizational learning AND performance measurement system	11
organizational learning AND management control system	5

In addition to the direct literature search, a considerable number of articles used in this study also came from the references included in the papers found with the literature search to avoid missing any important studies. In total, 135 sources including academic

articles and books were utilized in this study, part of which articles focusing on PMS or organizational learning exclusively.

The study is organized into three main parts. First, the theory of learning, particularly in the organizational context, is explained first in form of the general learning theories and then moving towards the detailed learning processes in the organizational context. Types of learning, the incremental single-loop learning as well as double-loop learning referring to more generative and innovative learning, as well as the mechanisms facilitating the information transfer between individual, group and organizational levels, form the core of the first chapter. In the second chapter, performance measurement systems and their theoretical background in organizational development and competitiveness is studied, placing the emphasis on the pursued outcomes of using PMS as well as their other consequences on organizations.

The third chapter binds the two topics of learning and performance measurement systems together, critically analyzes their relationships and the various linkages between them as presented in the academic literature, and builds a framework to systematically classify them. It discusses the implications of the current approaches to the topic, identifies gaps that by this far are left uncovered in the research, and provides direction for future research. The third part strives towards answering the research question by providing insight through explaining the sub-level research questions.

2 LEARNING IN ORGANIZATIONS

In the academic literature, the field of organizational learning is regularly pointed out as having a high degree of fragmentation and lack of common practice. Establishing a comprehensive theory of organizational learning is a formidable task, as different aspects of the topic have been studied from many disciplinary perspectives with different ontological views (Easterby-Smith 1997). All of these perspectives have their own focus areas and contributions to the literature: psychology studies cognition and dialogue; management science is focused on informating and single and double-loop learning; sociology and organization theory provide ideas on hierarchy and interests of actors; strategy considers experience and population-level learning; production management emphasizes productivity improvement and learning curves; and cultural anthropology contributes by studying cause and effect, and belief systems (Easterby-Smith 1997).

The objective of this chapter is not trying to map the whole field of organizational learning research, nor all the subtleties added into it by numerous researchers. Rather, the goal is to build an understanding of the key topics with the perspective of analyzing the linkages between learning and performance measurement systems. This study sets off by describing the orientations of learning on a general level and putting learning into an organizational context. It then describes the key processes of learning, single and double-loop learning. Last, the link from individual level learning to group and organizational learning is built.

2.1 Orientations of learning

The focus of this study is on learning in an organizational context. This requires a viewpoint of adult learning (andragogy) in distinction of that of children (pedagogy), as there are several points where adult learning differs. Importantly, adults are independent and capable of purposefully motivating themselves internally, via pursuits of self confidence and esteem, recognition and self-actualization. Effective role models can also trigger the motivation for learning. In addition, adults are self-directing, and their experiences can serve each other's learning as a resource. (Marquardt & Waddill 2004.)

To fully capture the processes of organizational learning, understanding the nature, principles and different viewpoints of learning theories in general is useful. Specifically for this study, Hall (2011) points out that processes of management control systems generating learning on the organizational level can be explained by a focus on individual learning. Our understanding and perception of the nature and fundamental processes

of learning also greatly affect what we consider proof that learning actually has occurred. Merriam & Caffarella (1999) recognize five orientations or schools of learning: cognitivist, behaviorist, humanist, social and constructivist. This categorization is consistent with other research and has received positive review, and it is also inclusive and broad by scope (Marquardt & Waddill 2004), which serves well the need for a fundamental categorization approach. Though there are advocates of all orientations and the different perspectives exist simultaneously in the literature, they can be roughly placed onto a timeline. Starting from the behaviorist orientation, where the perception of learning is the most mechanistic, it spans all the way to the conceptually more advanced social and constructivist orientations. Core ideas of each orientation regarding the view of the learning process and the locus of learning are summarized in Figure 1, and they are explained in detail in the following.

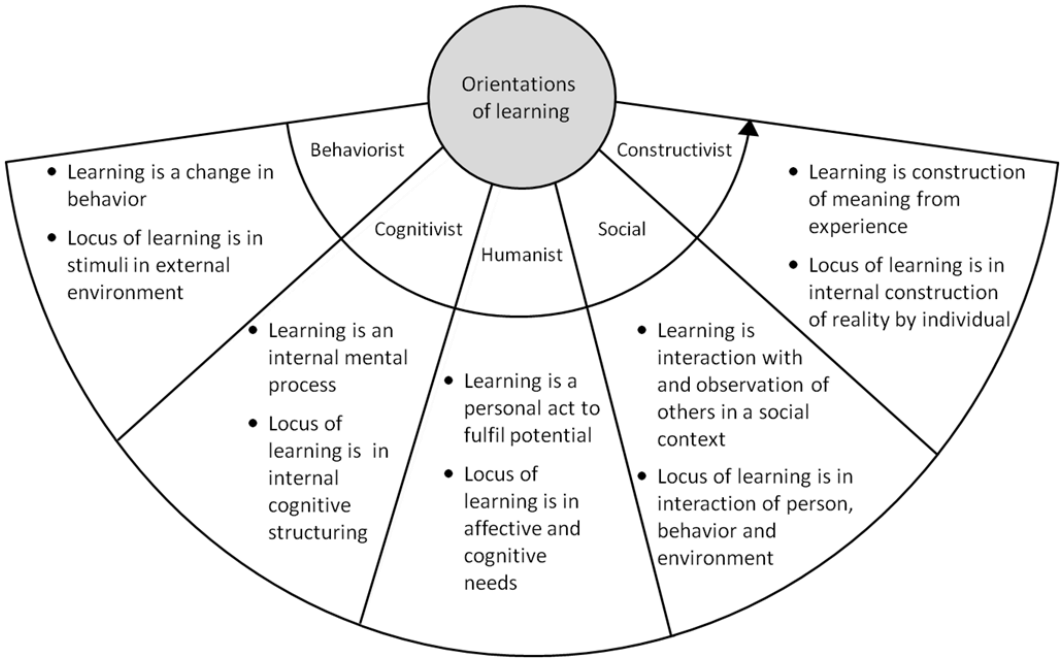

Figure 1. Orientations of learning – view of the learning process and locus of learning (Merriam & Caffarella 1999).

According to the behaviorist view, individuals are independent in terms of learning (Chiva & Alegre 2005). The behaviorists base their views about learning on processes like stimulus-response conditioning, where the change in behavior, rather than an internal thought process, is an indicator that learning has occurred (Merriam & Caffarella 1999; Marquardt & Waddill 2004). Thus, the learning process can be steered through control of the external environment, and it can be assisted by repeating and re-enforcing the learning behaviors (Marquardt & Waddill 2004). The adoption of behavior is also affected by how closely in time the action and its consequence are related, as well as the likelihood of the event to reoccur. Behaviorist approaches to enhancing learning include rewarding the preferred behaviors and ignoring or punishing for the undesired ones. (Merriam & Caffarella 1999.)

Cognitive theorists see that humans are capable of learning based on basic cognitive processes of insight, perception and attributing meaning (Merriam & Caffarella 1999; Marquardt & Waddill 2004). Cognitivists believe that learning is determined by the learner, not by the environmental elements affecting the process – in other words, the locus of control is in the learner himself, while behaviorists place it on the environment. Cognitivist orientation examines constructs like memory, information processing and expertise. (Merriam & Caffarella 1999.) When humans collect experiences and other inputs for the mental processes in the context of the environment they are surrounded by, they make sense, interpret, and build understanding, thereby learning (Merriam & Caffarella 1999; Marquardt & Waddill 2004). Learning is associated with accumulating and, subsequently, possessing knowledge (Chiva & Alegre 2005). Therefore, the cognitivists study how humans understand and learn by internal mental processes of acquiring, understanding and retaining knowledge (Marquardt & Waddill 2004). They believe that an individual is self-directed and autonomous, processing information and modifying their mental structures or models (Chiva & Alegre 2005; Hall 2011).

The humanist school, also sharing the autonomous view of the individual (Chiva & Alegre 2005), emphasizes the unlimited human potential for growth. Humanists dismiss the views of both behaviorists and cognitivists, claiming that an individual's behavior is shaped neither by the environment nor the subconscious mind, but rather that humans are able to freely shape their own actions (Merriam & Caffarella 1999). Their view is that learning is a complex process that cannot be simplified to mere changes in behavior or cognitive mechanisms, but should be understood as development of the whole person instead (Marquardt & Waddill 2004). Drawing on Maslow's hierarchy of needs, where the highest level is the need of self-actualization, humanists highlight one's internal motivation for learning, which they connect with the capability of determining one's own learning (Merriam & Caffarella 1999; Marquardt & Waddill 2004). Learning is self-initiated and best evaluated by the learner himself, and it is characterized by personal involvement and pervasiveness (Merriam & Caffarella 1999). Therefore, self-directed learning is in the core of many studies with a humanist approach (Marquardt & Waddill 2004).

The social orientation is a combination of both cognitive and behaviorist orientations (Merriam & Caffarella 1999). Advocates emphasize learning as a continuous process and the rich social context, where people interact and learn by communicating with and observing other people – not only through mechanical acquisition of knowledge (Marquardt & Waddill 2004; Chiva & Alegre 2005). The emphasis is on observation, which is a social setting by definition, but also in the subsequent reinforcement through imitation (Merriam & Caffarella 1999). Therefore learning can only occur in active participation (Blackler 1993; Gherardi et al. 1998). Learning is seen not only as getting to understand the world, but rather as a way of being in the world (Gherardi et al. 1998). Social learning may not be direct or purposeful, an example of which is provided in the social-

ization of new employees to the prevailing organizational culture (Marquardt & Waddill 2004). In fact, such learning typically is tacit, as in social situations learning occurs when people together do more than they yet know how to do (Blackler 1993). Learning takes place by observing and imitating others, and thus the social learning theory holds role models and mentoring activities important (Marquardt & Waddill 2004).

The fifth learning orientation is the constructivist approach. According to this view, the reality for individuals is formed in their internal constructions and interpretations; it is how people make sense of their experiences (Merriam & Caffarella 1999; Marquardt & Waddill 2004). No knowledge can be separated from its context and the personal meaning individuals give it (Marquardt & Waddill 2004). The focus in constructivist learning can be either on individuals and how they construct their mental models, or relationships, where individuals as social beings together construct an understanding of the world around them (Merriam & Caffarella 1999; Chiva & Alegre 2005). This social view suggests that meaning is created in a dialogic process where individuals are actively involved. Hence, the process of sharing and iterating the mental models first created by individuals actually bridges the gap between individual and social constructivist approaches. (Merriam & Caffarella 1999.)

The five fundamental orientations of learning differ in terms of their focus area as well as what is considered to constitute learning, or provide evidence that it has occurred. They also form a basis for research of learning in an organizational context. Definitions of organizational learning vary greatly according to the underlying learning theory, which in turn has an impact on the ways that organizational learning is said to be achieved. The next chapter discusses the variety of ways to define organizational learning, using the fundamental learning orientations as a starting point.

2.2 Learning in organizational context

Organizational learning, though a broadly discussed concept, involves a considerable amount of theoretical confusion and diversity, and the very definition is subject to controversy (Chiva & Alegre 2005). A great degree of fragmentation prevails in the field, as organizational learning has been studied from a number of disciplinary perspectives with distinct ontological views, including perspectives of psychology, sociology, management science, strategy, production management and cultural anthropology (Easterby-Smith 1997). To date, there is no clear consensus of the definition of organizational learning, and this lack of uniformity hinders constructive discussion and systematic research of the phenomenon. For example, Buckmaster (1999, after Edmondson & Moingeon 1996) presents a series of fragmented definitions for organizational learning, such as “encoding and modifying routines, acquiring knowledge useful to the organization, increasing the organizational capacity to take productive action, interpretation and sense making, developing knowledge about action-outcome relationships, and detection

and correction of error". Clearly, the definitions of organizational learning vary, and depend strongly on the fundamental perspective of what learning actually is and which orientation the author bases his understanding on.

Not all the five orientations of learning are equally represented in the organizational learning literature. As Chiva & Alegre (2005) point out, two perspectives to learning are dominant in the body of literature: the traditionally prevalent cognitive approach and the social approach. The two orientations can often be roughly divided according to the focus of the study. Research of individual learning is dominantly based on cognitivist learning theory with psychological and rationalist viewpoints, while the social orientation, looking at the learning phenomenon on the organizational level, mostly builds on sociology and relational views. In research, the social view is becoming an increasingly popular approach in analyzing organizational learning. (Chiva & Alegre 2005.) On both individual and social levels, also leanings towards the constructivist orientation exist, especially when a viewpoint of information processing and mental model development is applied. Of course, many definitions do not strictly represent one orientation only, but elements of different perspectives overlap in the practical definitions.

The most basic definitions of organizational learning are based on the behaviorist learning orientation. The behaviorists, like Senge (1990), emphasize a permanent change in the actual behavior. Dodgson (1993, cited by Oliver 2009) suggests organizational learning occurs when an organization performs in changed and better ways. Several researchers (e.g. Fiol & Lyles 1985; Huber 1991; Buckmaster 1999; Hall 2011), however, have presented critical arguments against a pure behaviorist learning conception. The behaviorist orientation is, for understandable reasons, poorly present in research. Learning by experimenting with actions and outcomes is irrelevant in a wider organizational context, as it is not possible to test every action before implementation (Feurer & Chaharbaghi 1995a). Highly abstract strategic planning and management processes usually also involve a large degree of learning, which is not necessarily reflected in behavior but in the managers' mental representations of reality.

The more popular cognitivist approach has its foundations on understanding learning as accumulation and possession of knowledge. It either sees learning in organizations based on human learning processes, which implies that organizations are able to learn due to similar capabilities to those of individuals, or simply understands organizational learning as individual learning in an organizational context. In this case, the role of learning key individuals in an organization is emphasized, as their learning is linked to organizational change and learning. Yet, critical voices about whether organizations or their learning can actually be reliably compared with human beings are well-justified. (Chiva & Alegre 2005.) Huber (1991), an advocate of cognitive approach, suggests that "an entity learns if, through its processing of information, the range of its potential behaviors is changed… an organization learns if any of its units acquire knowledge that it

recognizes potentially useful to the organization". Huber (1991) and Easterby-Smith (1997) cite this as a behaviorist view, but in fact the definition emphasizes the *potential* for behavior resulting from mental processing, implying that no actual behavior is needed for learning to occur. The real change occurs in the entity's mental models, allowing a wider understanding and a range of alternatives for behavior, but not indicating which action – if any – is taken. Therefore, this definition could rather be seen to manifest a cognitive, not behavioral standpoint. Fiol & Lyles's (1985) definition emphasizes an improvement in organizational effectiveness through better knowledge and understanding in order to claim learning has occurred, holding both cognition and consequent enhanced behavior important. They dismiss the idea of purely behavioral learning without understanding of the reasons behind immediate events terming it mere adaptation, and suggest instead that learning always requires development of mental associations (Fiol & Lyles 1985).

Marquardt & Reynolds (1994, cited by Kloot 1997) share a humanist view of self-directed learning, and claim that the learner needs to both recognize a problem and be motivated to learn, i.e. solve the problem. Huber (1991), Kim (1993) and Crossan et al. (1999), however, argue that learning does not have to be conscious. It does not always increase the effectiveness of the learner even potentially, nor does it need to result in observable changes in behavior as long as the entity is aware of different alternatives and has made a conscious choice on one of them (Huber 1991). This implies that the actual change does not necessarily happen in behavior, but in the cognitive mental maps, again supporting the cognitivist definitions. Yet, the humanist view arguably has its place especially in applications of organizational learning, for example in independent self-education and self-motivated learning.

The social perspective in organizational learning mixes cognitivist and behaviorist elements (Merriam & Caffarella 1999). It supposes that collective learning arises from social interaction and knowledge-sharing between the organizational members, and is affected by how individuals interpret and make sense of their work-related experiences (Bandura 1997; Merriam & Caffarella 1999). Thus, it takes place in both people's minds and in the social relations between them, but the focus shifts from information processing into participation and interaction, where language is a central construct (Gherardi et al. 1998; Gherardi 1999). According to Bandura (1997), organizational learning occurs through interactive psychosocial processes, not through "reified organizational attributes operating independently of the behavior of individuals". The key mediator between individual and organizational learning is often said to be dialogue (Chiva & Alegre 2005), but Oswick et al. (2000) see that dialogue itself has the ability to spark collective learning, not just distributing results of individual learning to others. The chain of individual knowledge translating into organizational through dialogue should be replaced by understanding engaging in dialogue as learning as such (Oswick et al. 2000). Social learning typically also occurs without conscious effort, for example

through socialization where new organizational members conform to the underlying norms and practices of the organization (Merriam & Caffarella 1999). When it comes to the linkage between these two levels of learning and the dynamic relationship in which the learning translates from one level to another, Chiva & Alegre (2005) suggest a psychosocial view, yet addressed by few researchers. Here, the dynamics between individual and organizational level learning, especially the fairly common conflict between organizational and personal goals (Modell 2012), are emphasized (Chiva & Alegre 2005). This makes it suitable for analyzing the organizational learning mechanisms transferring individual learning to the organizational knowledge and capability pool. Importantly, social learning perspective in organizational context stems from change, as the social practice of organizational life is constantly transforming. (Chiva & Alegre 2005.) Therefore, in the new era of environmental turbulence, social perspective on organizational learning is becoming increasingly relevant.

Dixon (1997), representing the constructivist learning perspective, states that organizational learning is about constructing new collective meanings in cooperation through dialogue, experience-sharing, and tolerance of different opinions. A knowledge processing and accumulation perspective has also been used, theorizing that organizational learning builds on organizational memory, i.e. previously accumulated knowledge and experience (Buckmaster 1999, after Argyris & Schön 1978). The construction of mental models shaped by experiences, adding new pieces of knowledge into the existing mental structures and modifying them is the key contribution of the constructivist perspective to defining organizational learning. Constructivist learning theory bridges the gap between individual and organizational learning (Merriam & Caffarella 1999). Developing mental constructions can be a cognitive effort of an individual, but also a collective process involving development of an organization's shared mental models (Dixon 1997) – values, norms, systems and structures.

Limiting strictly to one orientation is not likely to be fruitful because of the many dimensions of learning as a phenomenon and the contributions of different perspectives to the richness of the topic. Hence, aspects from different orientations are needed to address the complexity and the multi-level nature of organizational learning. A practical, broad definition is proposed by Espejo & Belahav (1996, cited by Buckmaster 1999): "To learn, organizations must test and improve their mental models and routines, by understanding changes in the business environment and adapting to them with compatible beliefs and behaviors." In this definition, aspects of cognitivist, behaviorist and constructivist learning orientations are merged. It also implies the important elements of adaptation, improvement and continuity. Thus, learning draws from a cyclical, accumulative process of experiencing, reflection, hypothesis building and testing (Feurer & Chaharbaghi 1995a ; Buckmaster 1999). As the humanist view is strongly based on self-directed, motivated and conscious learning effort, it is in many cases inappropriate to fully understand all the subtleties – learning often emerges as an unconscious process

(Huber 1991; Crossan et al. 1999). Yet, the humanist viewpoint may be useful in acknowledging the impact of training and professional self-development. A stronger social element, however, could be added to address the critical importance of mediating and generative dialogue across all organizational levels, essential in spreading and translating individual learning into organizational learning. Table 2 summarizes the key findings of the various perspectives on organizational learning.

Table 2. Summary of perspectives on organizational learning.

	Focus on individual ←			→ Focus on collective	
	Behaviorist	Cognitivist	Humanist	Constructivist	Social
Essence of organizational learning	Organization changes its actions and consequently performs better	Range of potential behaviors is changed through information processing	Learner must both recognize problem and be motivated to learn how to solve it	Construction of new collective meanings in cooperation through dialogue and experience sharing	Learning arises from social interactions between organizational members
Manifestation in org. learning	Mechanistic adaptation to observed variations from targets, skill development	Information processing, organizational memory	Self-education, intrinsic motivation to learn	Negotiating and iterating shared meaning in dialogue	Socialization, transfer of individual learning to organizational level, mentoring
Examples of advocates	Senge (1990), Dodgson (1993)	Huber (1991), Fiol & Lyles (1985)	Marquardt & Reynolds (1994)	Dixon (1997), Crossan et al. (1999)	Bandura (1997)

2.3 The two levels of learning

Generally, learning theories recognize two related processes of learning, which differ in terms of focus on efficiency and productivity versus creativity and innovation. Examples from the literature include information exploitation and exploration (March 1991); single- and double-loop learning (Argyris & Schön 1978); mental model building and confirming (Vandenbosch & Higgins 1995; Hall 2011); lower and higher level learning (Fiol & Lyles 1985); adaptive and generative learning (Senge 1990); operational and conceptual learning (Kim 1993); and primary and value learning cycles (Feurer & Chaharbaghi 1995a).

Regardless of the subtle differences in the definitions of the concept pairs, the main idea is that the lower level concept is about progressing to achieve preset objectives and the more advanced concept refers to questioning the validity of and assumptions behind the goals (Buckmaster 1999). As Huber (1991) suspected, the current view is that the two

processes are not distinct in practice, but operate seamlessly together, feed each other, and thus cannot be viewed in isolation (Feurer & Chaharbaghi 1995a; Oliver 2009). Exploitative and explorative activities are complementary, and under resource constraints, require trade-offs (March 1991). Therefore, organizational learning requires balancing consistency and change, and a sound learning system requires both approaches (March 1991; Feurer & Chaharbaghi 1995a; Oliver 2009).

2.3.1 Single-loop learning

Though the exact definitions of these two-dimensional learning processes may vary slightly in the literature, the main principle behind them is similar. For example, single-loop learning and double-loop learning, the most widely used concepts also applied in this study, are cognitive processes used to confirm and build the mental models of individuals. Exploitation, single-loop learning and mental model building all refer to a learning process of incremental development, also termed lower level learning, adaptive learning and adjustment learning (Fried 2010).

Single-loop learning is problem-driven (Gherardi 1999). It focuses on methods and tools incrementally improving existing operations (Oliver 2009). Single-loop learning occurs when managers observe errors or deviations from the strategy implementation plan and respond to them with corrective actions, yet remaining within stated policy guidelines – deviations do not cause them to question the validity of the planned objectives or the means to achieve them (Kaplan & Norton 1996b; Fried 2010). Buckmaster (1999) adds that the observed error could also be any feature that inhibits learning. Therefore, detecting and removing obstacles that hinder organizational members from learning more efficiently is also a part of the single-loop learning process.

The ultimate guidance for an organization's actions comes from the strategy. Organizations pursue their strategies by establishing and implementing step-by-step plans towards the ultimate goal. The plans reflect the management's understanding of the causal relationships between actions and outcomes in the specific environmental setting. In single-loop learning, the objective remains unchanged – the underlying fundamental assumptions about how the business operates, how the environment affects it and what kinds of actions should be taken to address this, are not challenged or questioned (Kaplan & Norton 1996b). The management monitors the implementation process of preset plans, and if they observe deviations from the planned trajectory, they adapt their actions according to their understanding of what kinds of actions produce the desired outcome. This simple adaptation does not require deeper understanding or validation of causal relationships, but is rather a defensive adjustment to a changed environment (Fiol & Lyles 1985). Thus, it is often related to routine, immediate tasks and it usually touches only a part of the organization (Fiol & Lyles 1985; Huber 1991, after Argyris 1983).

Single-loop learning as a deviation observing and correcting process can be depicted using the classic improvement cycle: Plan, Do, Check, Act (Dervitsiotis 2004). The cycle, illustrated in Figure 2, starts from the existing organizational goals, which are pursued with certain actions implying beliefs about the prevailing causalities. The outcomes of these actions are monitored, often through performance measurement systems. If deviations from plans appear, required adjustments are determined and action plans consequently developed, without questioning whether the goals themselves are still valid. The plans are then implemented, and with the observing of the outcomes of the actions, the cycle can start over.

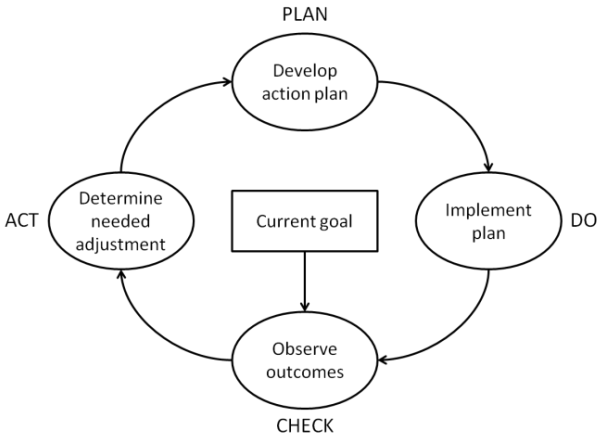

Figure 2. Single-loop learning - Plan Do Check Act cycle (Dervitsiotis 2004).

Even though this type of learning is sometimes referred to as lower-level learning and presented inferior to more sophisticated types of learning, it should not be underestimated in terms of importance for organizations. In their day-to-day work, where mechanistic execution of previously agreed plans is needed to remain aligned with the strategic objectives, single-loop learning is crucial (Kaplan & Norton 1996b). Since organizations, and management information systems in particular, are designed to identify and correct errors, single-loop learning is by far the most common type of learning in organizations. It promotes efficiency and productivity, especially in more stable environments. (Argyris & Schön 1978; Hall 2011.) However, there is a risk related to this type of learning becoming too dominant in the organization. Organizations relying prominently on single-loop learning processes often contain high inertia: creating or even adapting to change is cumbersome, as the prevailing practices and theory of business are not scrutinized or questioned (Fried 2010). Still, change is the prerequisite for development and a major source of opportunities that organizations can capture for competitive advantage. Confirming existing perceptions about the business operations might also be a subconscious act to ignore or not to perceive those cues that do not support the existing mental models, which may result in unintended or even dysfunctional consequences (Hall 2011) – a negative phenomenon called cognitive dissonance (Fried 2010).

2.3.2 Double-loop learning

As most of today's organizations are forced to operate in a rapidly changing environment, small adjustments to the business operations may not be enough to meet the goals agreed upon. The strategies to address constant change are more complex, and so is the feedback about them produced by performance measurement systems (Kaplan & Norton 1996b). Sometimes the fundamental expectations about how to be successful in the governing environmental conditions have become obsolete, as a result of changes in the environment. The logic behind how causal relationships link organizational actions and outcomes may become flawed – for example, if a company used to grow its market share successfully by offering the lowest price, it may not notice that the fundamental market preferences have changed towards higher customizability. In this kind of situation, making the production process more and more efficient to be able to lower the cost will no longer gain a higher market share – the assumptions about prevailing causalities have become invalid. Fiol & Lyles (1985) even see double-loop learning arising from a totally different learning theory compared to single-loop learning: they suggest that double-loop learning represents a more cognitive type, whereas single-loop learning is based on repetition, implying a leaning towards a behaviorist theoretical foundation.

It is clear that feedback is needed about how the execution of the strategy matches the plans, as in single-loop learning. Yet, even more importantly, the management needs feedback about whether the assumptions underlying the strategy when it was launched still hold true. (Kaplan & Norton 1996b.) Double-loop learning, or other adjacent learning concepts such as mental model building, explorative learning or generative learning, addresses the need for a more radical and comprehensive type of learning (Feurer & Chaharbaghi 1995a; Fried 2010; Hall 2010). Other terms depicting a similar, more transformational learning process include higher level learning, turnover learning, and strategic learning (Kaplan & Norton 1996b; Fried 2010).

Double-loop learning is a reflective process, where the existing theory of business is monitored and scrutinized in order to understand, whether the perceptions and assumptions underlying what is being done are still valid in the constantly changing business environment (Oliver 2009; Fried 2010). Deviations from the intended track are not corrected by only making adjustments within the existing framework, since the error is diagnosed as an incompatibility of prevailing values (Buckmaster 1999). Instead, new understanding must be developed about how the business operates and how it matches the environmental requirements, while old routines, assumptions and beliefs are questioned. The focus of double-loop learning is in longer-range outcomes concerning the whole organization, and the learning is usually linked to non-routine tasks (Huber 1991, after Argyris 1983), like managing a crisis situation. Double-loop learning may be triggered by a crisis caused by an event in the external environment, a revolution from within the organization, or a management-created crisis to shake up the organization. It

forces the search for a new operational paradigm to replace the current, dysfunctional one. (Kloot 1997.) Dervitsiotis (2004) specifies that the validity of the current strategy often changes in accordance with developments in the environment reshaping the rules of the game, such as broader trends in technology or geopolitics.

What separates double-loop learning from single-loop learning, characterized by Plan Do Check Act cycle, is the additional cycle where the governing assumptions are validated – hence the expression "double loop". Double-loop learning is illustrated in Figure 3. When outcomes of organizational actions are observed, it is essential to validate from time to time, whether the goals and the means to achieving them still hold true. After the validation, goals are refined or new goals developed, and the organization can return to the day-to-day operating single-loop learning process – either by establishing the new goals if needed, or by continuing normally to the action plan development phase.

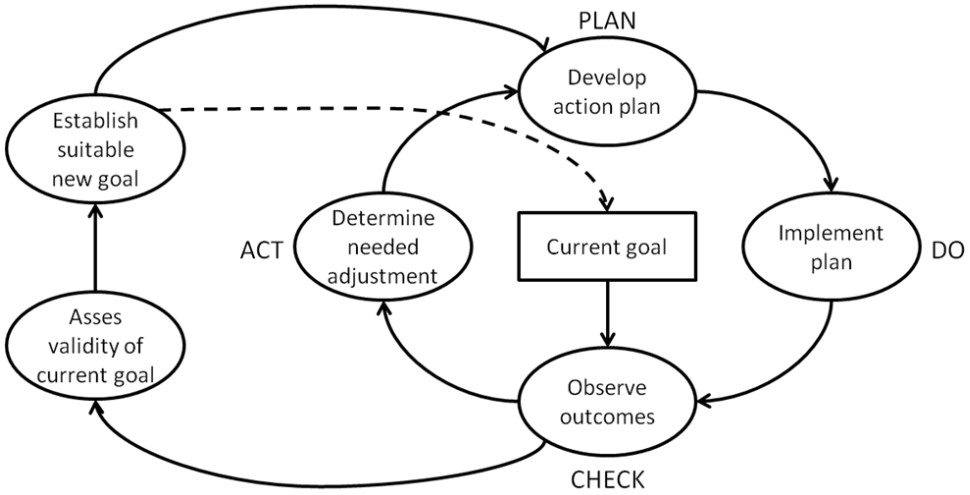

Figure 3. Double-loop learning (Dervitsiotis 2004).

To enhance the organization's capability of double-loop learning, supportive practices, systems and structures are needed. Importantly, emphasizing the impact of communication, Kaplan & Norton (1996b) say that to incorporate the new understanding into operations, the ideas about strategic opportunities and possible new directions must be distributed broadly in the organization. Effective communication and openness are particularly important, because challenging underlying structures and norms often involves struggles over power and control (Buckmaster 1999). Moreover, to ensure the full potential of the organization's learning capacity is exploited, the double-loop learning process should be embedded in the management systems and procedures. That way it is made into a regular and inseparable part of them, creating a culture of systemic questioning of the validity of current objectives. (Kaplan & Norton 1996b; Dervitsiotis 2004.) Double-loop learning requires systematic information collection and analysis from a series of sources, ranging from personal observation to instrumentation and

measurement, and being receptive for opportunities to take advantage of changes in the environment. It occurs when the underlying assumptions are questioned and the current theory is reflected against contemporary evidence, observations and experience. (Kaplan & Norton 1996b.)

New knowledge about the environment must be continuously generated to keep up with the changes in the external environment and to adapt the strategy accordingly, or "learn their way out of their problems" (Dixon 1997). Yet, organizations also need to be aware of the strategic alternatives available, should the situation change. As part of the previously acquired knowledge has become obsolete and must be replaced with up-to-date knowledge, a process of "unlearning" is required to abandon inappropriate behaviors and routines. (Feurer & Chaharbaghi 1995a.) It is important for an organization to be able not just to forget but to intentionally discard invalid information and dysfunctional behaviors, though challenging the status quo. Giving up old, comfortable routines is difficult and requires overcoming the inertia – in fact, it might be even harder for organizations to unlearn than learn. (Huber 1991; Easterby-Smith 1997; Melnyk et al 2010.)

Comparing to double-loop learning, single-loop learning is a mechanistic, adaptive and reactive way of learning. It corrects symptoms instead of the underlying disease (Batac & Carassus 2009). It does not attempt to produce new ideas or innovations, and some authors see this kind of incremental monitoring and responding without association building process as mere behavioral adaptation, not learning at all (Fiol & Lyles 1985). When organizational learning capability is pointed out as something organizations should strive for and as a source of competitive advantage, it is usually double-loop learning that is meant, not learning in general. Clearly, PMS are traditionally designed specifically for single-loop learning purposes – measuring results of organizational actions and giving feedback about them for fine-tuning of actions to achieve predefined goals. However, in the new era of contemporary performance measurement, it is double-loop learning and its outcomes that are pursued by using PMS in an interactive fashion: innovativeness, creativity, change, flexibility and competitive advantage (Henri 2006a; 2006b). Therefore, it is double-loop learning more representative of the contemporary organizational interests that will be in the core of this study.

Organizations are not capable of learning by themselves, but only through individuals (Argyris & Schön 1978). On the other hand, organizations do not depend on every single member to learn, and they provide frameworks and structures for enabling individual learners to achieve higher results collectively (Romme & Dillen 1997). Therefore it is important to understand the linkage between individuals and organizations and how the learning generated by individuals is incorporated into the organization's learning pool. Also single and double-loop learning as learning processes can and should be considered on both levels. On individual level, single loop learning changes the behavior of an individual (Kim 1993) as they respond to environmental changes by detecting and cor-

recting their own errors (Leitch et al. 1996). Double-loop learning, on the other hand, involves the two-way relationship between mental models and learning cycle (Kim 1993). Thus, an individual's existing mental models influence his learning, whilst learning potentially changes these mental models. Organizational learning may lead to changes in individual actions via the single-loop learning process (Kim 1993) within the organizational normative framework (Leitch et al. 1996), and double-loop learning transfers individual mental models into collective ones (Kim 1993) by questioning the governing norms and establishing new ones (Leitch et al. 1996). In the next chapter, the processes through which individual learning translates into organizational learning are examined in detail.

2.4 Relationship between individual and organizational learning

Organizational learning is often examined as a system – organizations provide platforms for accumulation of information and knowledge, and individuals can develop their learning upon these systems by acquiring, interpreting, diffusing and storing information in the process where they learn from organizational experiences (Huber 1991; Chenhall 2005). As a system, comprising structures and strategies with facilitating features, organizations may have capabilities assisting all of its members in learning (Garvin 1993). In this view, an organization is like an organism, a living entity with the capability of learning by itself.

Organizations do have memory in the sense of having cognitive systems that sustain values, norms, behaviors and mental maps, but they do not have brains and thus cannot learn independently (Fiol & Lyles 1985, after Hedberg 1981; Dodgson 1993). Therefore, rather than a system, some authors view the organizational learning process through the knowledge contribution of individual organizational members, who act as learning agents for the organization (Argyris 1982). Leitch et al. (1996) state that as an organization learn through its individual members and thus individual learning affects it directly or indirectly. Here, the influence of the most important individuals for the organization, managers, is the key. The learning processes of managers are obviously crucial for organizational learning, because their role in interpreting information to others, formulating problems and thus affecting the organization's behavior is significant (Vandenbosch & Higgins 1995; Mazutis & Slawinski 2008). To understand how the organizational learning takes place, it is therefore essential to understand the learning theories on an individual level, especially among leadership (Kim 1993; Mazutis & Slawinski 2008).

Understanding individual learning, however, is not enough to understand organizational learning. They differ fundamentally in that individuals perform all the learning subprocesses by themselves, while in organizations the different functions are performed by

specialized groups due to the complexity and magnitude of organizational activities (Bandura 1997). In addition to individual learning, it is necessary to understand group level learning and what kinds of infrastructures and networks are needed to share learning experiences throughout organizations (Kloot 1997, after Marquardt & Reynolds 1994). Some authors see that an organization learns if one of its units acquires knowledge (Huber 1991), but most point out that organizations constitute more than the individuals in them (Kim 1993; Crossan et al. 1999), and the same applies to organizational learning: it is not only the sum of its individual employees' learning (Agyris & Schön 1978; Fiol & Lyles 1985). Organizational learning produces associations, cognitive systems and memories shared and developed by organizational members (Fiol & Lyles 1985). A distinction is made between the learning involving individuals, groups and complete organizations (Oliver 2009), but all the levels of learning are essential for the organizational learning to occur (Feurer & Chaharbaghi 1995a; Crossan et al. 1999). It is the sharing and refining of the knowledge from individual learning collaboratively that constitutes organizational learning.

In summary, the experiences and actions of individuals are the only channel for organizational learning, but organizational learning constitutes more than the learning of individual organizational members (Kim 1993; Leitch et al. 1996; Romme & Dillen 1997; Chiva & Alegre 2005). Though closely related, a distinction between individual and organizational learning should therefore be made to avoid oversimplification (Kim 1993). Leitch et al. (1996) see organizational development as a subsequent process to management development, but although individual is the only entity learning, in organizational learning he is a part of a larger learning system (Romme & Dillen 1997) – organizational development and self-development are symbiotic.

How individual learning actually translates into organizational learning and knowledge is mediated through organizational learning mechanisms (OLMs) that can create or improve learning opportunities (Armstrong & Foley 2003). They are structures and procedures as well as cultural facets that assist the learning process by allowing organizations to systematically collect, analyze, store, disseminate and use relevant information (Armstrong & Foley 2003; Oliver 2009). OLMs enable actions and experiences of individuals to become shared intellectual capital of the entire organization. This embedding of information occurs via processes of distribution of information to others or adapting operating procedures to reflect the newly acquired information. (Oliver 2009.) Swart & Harcup (2012) believe that the type of knowledge to be transferred from one level to another affects the mechanisms employed, and depending on knowledge type, these mechanisms involve the use of templates to capture and translate knowledge, organizational structure, or motivation and trust, for instance. The transfer of learning takes place when individual organizational members make their mental models explicit, by sharing and displaying new behaviors and shifts in thinking, observed and enacted by others (Kim 1993; Swart & Harcup 2012).

Performance measurement systems, especially when used for the purpose of focusing attention (Henri 2006a) can be powerful organizational learning mechanisms. This is possible when managers implicitly communicate their views and assumptions about the organization, its relation to the environment, and the opportunities and uncertainties facing it by their selection of suitable measures for the PMS (Henri 2006a). The selected measures convey their mental models and reflect their understanding of the business logic and its causalities, and they send a message to the employees about what kinds of actions to pursue. This is how managers can distribute their learning in form of changed mental models into the organization. With the structure of the PMS and the hierarchy of the metrics in it, managers can also point out the priority order of the objectives (Marginson 2002).

Fiol & Lyles (1985) suggest four contextual mechanisms enhancing the likelihood of organizational learning. First, corporate culture should be conducive to learning so that its norms and values support behavioral and cognitive development (Fiol & Lyles 1985). The learning approach should be embedded into the organizational procedures and relationships, allowing it to shape the organizational culture as a whole (Swart & Harcup 2012). In the cultural embedding process, the example and behavior of leaders is crucial (Crossan et al. 1999). Second, the strategy of the organization should allow flexibility in reaching the strategic objectives, leaving room for creativity and learning when designing actions to reach these goals. Third, the organizational structure should be decentralized instead of mechanistic, and favor empowerment allowing innovation. (Fiol & Lyles 1985.) The best organization structures are prepared to learn and designed to facilitate change (Kloot 1997). Interestingly, though hierarchical organizations do not perform as well in learning as flatter team organizations, they are less vulnerable to losing knowledge as a result of personnel turnover, since knowledge and skills are also transferred to management and institutionalized to a large extent – this suggests that some degree of hierarchy is needed to sustain the learning in the organization (Carley 1992). Finally, the environment should have a balance of dynamism and stability, in order to enable mental mapping of the environment (Fiol & Lyles 1985). Too much turbulence makes it impossible to decipher and cognitively organize environmental perceptions.

2.4.1 Role of dialogue in organizational learning

Dialogue is often pointed out as the prominent mechanism, which bridges the gap between individual and organizational learning, emphasizing the social characteristics of learning (Chiva & Alegre 2005). It is the core mechanism through which learning at and between different organizational levels can be influenced by leaders (Mazutis & Slawinski 2008). Group learning, between individual and organizational learning, starts with dialogue and thinking together, which allows the group to exceed the performance of individuals comprising it – people become observers of their own thinking (Senge

1990). They are able to refine their ideas collectively and push the boundaries of each other's thinking. In dialogue, ideas are examined collaboratively from different viewpoints, resulting in a free exploration employing the full range of the participants' experience and proficiency (Senge 1990). Without conversation, ideas cannot be effectively exchanged and a shared understanding cannot be developed (Mazutis & Slawinski 2008).

Dialogue links tightly to the integration phase of the organizational learning cycle discussed in more detail in the next chapter, as it is through dialogue that a richer interpretation of the new ideas is reached and individual opinions add to the common understanding without being decisive (Senge 1990; Crossan et al. 1999). In the integrating phase, individuals achieve a common understanding and create shared meanings. Leaders, providing guidance and facilitation, can enable organizational learning through the mechanism of authentic, open and honest dialogue. (Mazutis & Slawinski 2008.) Existence of open dialogue and its facilitating effects on learning depend to a large extent on organization's cultural characteristic, such as openness, transparency and public reflection (Mazutis & Slawinski 2008), and creating an environment that encourages learning among individuals (Oliver 2009).

Regarding the learning types specifically, dialogue is directly connected to double-loop learning. Single-loop learning does not essentially require dialogue – errors eroding effectiveness and creating deviations from the plans are detected and corrected in a quick-fix manner. Surely, open exchange of thoughts and observations will also enhance error detection and correction (Mazutis & Slawinski 2008), but a mechanistic and adaptive single-loop learning process does not rely as heavily on ground-breaking new ideas and visions. For double-loop learning, however, dialogue is critical, because it enables inconsistencies to be surfaced and addressed (Mazutis & Slawinski 2008). The more people experience personal confrontations inherent in interaction, the more likely they are to pass the action threshold to pay attention to problems and improvement needs (Van de Ven 1986). Dialogue encourages individuals to participate, question assumptions, and voice their novel ideas as well as pertinent concerns, which has the capability of triggering a double-loop learning process (Mazutis & Slawinski 2008).

As dialogue is connected to organizational learning, particularly double-loop learning, it can find support and facilitation from interactive performance measurement systems. When PMS are designed and used interactively, they can foster dialogue throughout the organization (Henri 2006a). This effect is amplified when the PMS involves a comprehensive set of both financial and non-financial measures – non-financial measures are commonly used as a basis for performance result discussion and evaluation (Dossi & Patelli 2006). Strategic dialogue, forced by PMS, enables the various stakeholders to share their ideas, opinions, visions and mental models (De Haas & Kleingeld 1999). The power of PMS is not only in measurement, but in providing a forum for discussion

(Bourne et al. 2000). It challenges organizational members to discuss the causes and effects, convey their mental models and underlying assumptions about them, and propose solutions to problems indicated by measurement outcomes.

Dialogue and conversation are not only useful in expressing ideas and conveying established meaning to others or in distributing information, but also in developing new insights through collaborative and iterative effort and evolving new meaning (Crossan et al. 1999). Successful learning requires involvement and motivation effectively generated in groups, and in collaborative learning dialogue is the key element stimulating organizational members to think together (Senge 1990; Romme & Dillen 1997). Creating discussion is creating opportunities for learning (DeVilbiss 2006). Dialogue and interaction is, eventually, the one single factor facilitating or inhibiting transfer of learning between organizational levels. This is because it is the social processes and group dynamics through which the interaction occurs, and through which the learning will spread to benefit the organization as a whole. (Crossan et al. 1999.) It is not just a way of generating and spreading new knowledge, but can also be used to overcome obstacles for learning, especially those related to role constrained and fragmented learning (Romme & Dillen 1997). Finally, dialogue may probe questioning of embedded, underlying assumptions through double-loop learning process, allowing the emergence of new strategies (Kloot 1997).

2.4.2 The organizational learning cycle

Learning is often described as a repetitive cycle of hypothesis testing and analyzing the outcomes, which causes the emergence of new hypotheses (Feurer & Chaharbaghi 1995). To understand the functioning of organizational learning in building up an organization's knowledge pool by integrating processed information into it, Huber (1991) has proposed a framework of four information processing constructs widely recognized in the literature. However, as discussed, many authors emphasize the importance of individual-organizational level interface and linkages in painting a full picture of organizational learning, which is not fully reflected in Huber's work. How the accumulated learning in the private mental storages of individuals is actually translated and distributed for the benefit of the whole organization has been addressed in higher detail by Crossan et al. (1999). The organizational learning models presented by Huber (1991) and Crossan et al. (1999) are, to a large extent, analogous and complement each other. To develop a full understanding about the process both in terms of information processing and crossing the individual-organizational level interface, these two models are next viewed simultaneously.

From the viewpoint of learning as information processing, Huber (1991) points out four constructs in the heart of organizational learning: knowledge acquisition, information distribution, information interpretation and organizational memory. Unlike Huber (1991) who describes these four concepts as constructs, implying their independent na-

ture, Crossan et al. (1999) emphasize the continuous process-like nature of organizational learning. They suggest a four-step process – intuiting, interpreting, integrating and institutionalizing – where the focus is on transferring the learning outcomes across different levels in the organization, facilitated by feedback (and feed-forward). The definition of feedback by Senge (1990) recognizes feedback to comprise both backward and forward loops, making no difference between the effects pursued with it, but Crossan et al. (1999) pinpoint the exploitative nature of feedback and the explorative nature of feed-forward. It has to be emphasized that the process pervades three levels – individual, group and organizational – and some of the process phases are distinct for one level, while others overlap and develop through different levels. The interconnectedness of the levels and the transfer processes between them received no attention from Huber (1991), whose description of information processing is more mechanistic. Moreover, the process should not be seen as strictly linear and one-directional, since the very nature of the process is iterative and cyclical. A synthesis of Huber's (1991) and Crossan et alii's (1999) views is illustrated in Figure 4.

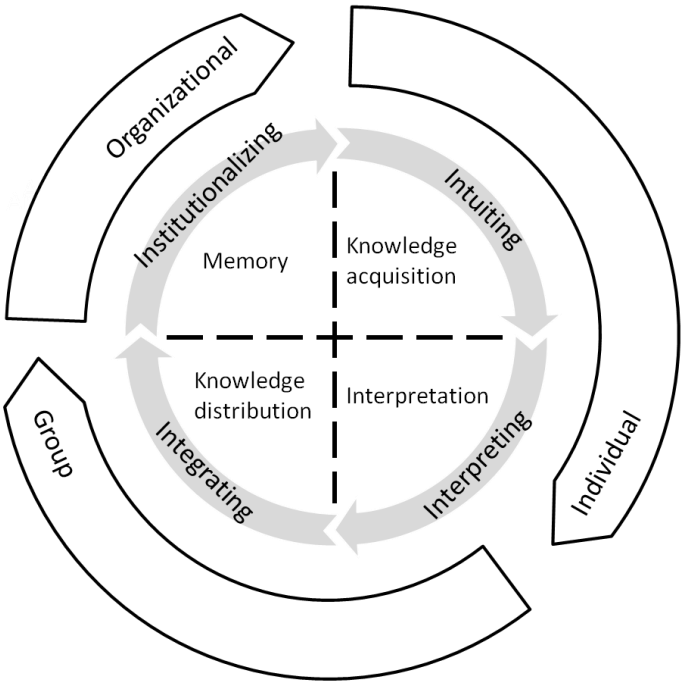

Figure 4. Organizational learning cycle (Huber 1991; Crossan et al. 1999).

The first phase in Crossan et alii's (1999) model is a largely subconscious *intuiting* process, occurring on individual level. This is the phase where the faintest hint of understanding is beginning to form for the first time, developing into emerging ideas. It involves visioning, metaphors and seeing patterns and analogies between situations (Crossan et al. 1999). Quite similarly, the first one of Huber's (1991) organizational learning constructs is *knowledge acquisition*. The source might be previously inherited knowledge, which to a large extent determines the organization's learning capacity.

New knowledge can also be acquired through a direct concrete experience, learning by doing, often unintentionally and unsystematically. (Huber 1991; Romme & Dillen 1997.) The trigger of learning may also be second-hand experience from observing and imitating other organizations (e.g. benchmarking), grafting knowledge in form of acquiring employees or organizations bringing their knowledge into the organization, or conscious search for new information (Huber 1991). The most striking difference between Huber's (1991) and Crossan et alii's (1999) frameworks is what is acknowledged as knowledge. In Huber's (1991) work, knowledge takes quite an organized and digestible form. Knowledge is something that is readily structured and processed so that it can be expressed and understood as such – it is waiting somewhere, ready to simply be mechanically 'acquired'. Crossan et al. (1999), however, see knowledge as a lot fainter and emerging type of ideas, patterns, linkages and associations. In this view, knowledge does not have to be structured, readily digestible or understandable. Ambiguity and obscurity are allowed, and the implication is that knowledge can be iterated and formalized later in the process. This difference can be seen in Huber's (1991) listing of potential sources for knowledge, mostly representing sources for rather established information, while Crossan et al. (1999) point out the often subconscious nature of emerging knowledge. In practice, the authors' views complement each other, as both ways are naturally valid sources for information in initiating learning.

The second phase in Crossan et alii's (1999) 4i-model is *interpretation*, starting already on individual level, where individuals begin to decipher the emerging ideas and observed analogies, and start formulating them into voiced expressions. The interpretation process forms a bridge to the group level, when individuals share their ideas with others and they try to make sense of it and refine it together. In interactive dialogue, interpretations grow richer and more robust than they would in isolation. (Crossan et al. 1999.) A similar *knowledge interpretation* phase is recognized by Huber (1991), but he introduces it only after distributing the information. This implies that in his view distribution of information across organization would precede the interpretation, which would then happen in groups of smaller size able to discuss productively. The flow seems somewhat illogical, as it would mean shifting from individual to organizational level and then returning back to group level. In line with the thoughts of Crossan et al. (1999), Chenhall (2005) suggests information would first be given meaning to, and only then distributed in the organization. In reality, both views may be correct. Information sharing in organizations rarely occurs in one-way communication, as interaction and dialogue go both ways in social situations. Thus the meaning is given to the information in a collaborative dialogue, and while information pervades through the organization these two processes overlap and organizational members iterate the interpretations towards a common understanding. Also Mausolff (2004) suggests that interpretation could actually be an integral part of any process phase.

Similar standpoint is taken by Crossan et al. (1999), as they suggest the *integration* phase starts already on the group level and continues to the organization-wide level. When a group develops a shared understanding about the knowledge and takes coordinated action in integration phase, the explicit knowledge is again internalized into tacit knowledge (Crossan et al. 1999). By placing the integration phase between group and organizational levels, they imply that the deeper adoption of the new ideas and attaching them into the existing mental structures pervades throughout the groups and finally the entire organization. The same analogy inspires the *knowledge distribution* construct in Huber's (1991) model, sharing information from different sources and leading to new understanding, but the two models again complement each other. Crossan et al. (1999) describes integration more vaguely as 'development of shared understanding' through discussion with a focus within a group. They do not specify how the understanding actually is shared in practice and how integration of knowledge takes places on intergroup and organizational level – let alone how effective coordinated action could be taken without a more formal process of information distribution. Huber's (1991) more practical approach contributes to this by emphasizing the processes and concrete actions that must be taken to effectively distribute novel ideas throughout the organization. As mentioned, the two authors' views conflict in terms of the order of occurrence between interpretation and integration/distribution, but the reality is likely to be overlapping and iterative. The extent to which information is distributed within the organization affects the ease of retrieval and the risk of deterioration, i.e. losing information as a result of employee turnover (Romme & Dillen 1997).

Finally, when information has been spread in the organization and given a shared interpretation, it is stored into the *organizational memory* for future use both as formal documents and informal mental models (Huber 1991; Chenhall 2005). Essentially, organizational memory involves embedding knowledge into structures, systems, strategy and procedures of the organization – a process Crossan et al. (1999) term *institutionalization.* This is how the knowledge first acquired by individuals becomes a part of the organization's collective memory, and remains undistorted even when the individuals leave the organization (Crossan et al . 1999). While Huber (1991) sees organizational memory rather narrowly and mechanistically focusing on concrete information storage systems, such as computerized memory, Crossan et al. (1999) highlight the informal way of embedding knowledge into structural, procedural and cultural artifacts. Both aspects and their seamless cooperation are required to ensure that learning becomes an integral part of the organization and its actions. According to Romme & Dillen (1997), five different types of storages are available to organizational memories, including: individual memories for personal experiences and observations; organizational culture storing knowledge about possible solutions to problems; transformations consisting of guidelines for standard procedures and systems; organizational structure as a framework for individual behavior and roles; and physical structures like workplaces and layouts. Finally, when the knowledge that first emerged in individuals' minds has developed

through the 4i-process and become institutionalized as part of the organizational practices, it is embedded in the structures and procedures creating a template upon which new learning can evolve. The cycle can start over, and the previously accumulated knowledge forms a framework and structure, where new knowledge is attached. Learning is a continuous, accumulative and cyclical process.

Performance measurement systems can support and encourage the organizational learning process on all stages (Chenhall 2005). Huber (1991) points out that structured yet proactive procedures can facilitate learning, and PMS can act as a formal tool for mapping and evaluating information in the knowledge acquisition phase (Chenhall 2005). Both financial and non-financial measures can contribute to knowledge acquisition (Kloot 1997). PMS collect information about the organizational performance in its environmental context, which acts as a valuable source for this phase. In the interpretation process, PMS with a strategic focus can help to frame the information so that a common interpretation can be formed (Kloot 1997; Chenhall 2005). Simons (1995b) also observed how PMS may have an important role in distributing information regarding strategic priorities throughout the organization. Indeed, the measures managers choose to include in the PMS convey important cues about their views and underlying assumptions about the business operations (Henri 2006a). Organizations also use multidimensional PMS to relative performance evaluation between subsidiaries, which helps to identify, communicate and diffuse best practices throughout the organization and to learn from them (Dossi & Patelli 2006). Finally, organizational memory is heavily dependent on formal information systems to store information so that employee turnover does not cause information deterioration (Huber 1991; Romme & Dillen 1997). For this purpose, PMS provides a storage for information on strategic plans and the tracking of subsequent events (Chenhall 2005).

2.4.3 Obstacles for learning

Organizational learning mechanisms are contextual or mediating factors that can create or improve opportunities for learning (Armstrong & Foley 2003). Similarly, there are certain structures, procedures and psychological mechanisms that can hinder or inhibit learning from occurring. Not all of them are solely disadvantageous, as they may also be procedures, structures or cultural facets intentionally established in organizations to produce positive effects locally, but they may generate negative effects on organizational learning as a whole (Romme & Dillen 1997).

Change is integral to organizational learning, and ability to change and adapt to the dynamic external environment is the only recipe for success for organizations. However, human beings, from a psychological perspective, like to stay within accustomed routines and frameworks – on their comfort zone. Thus, resistance to change is a very common obstacle for learning in organizations. Both human mind and the structures of an organization are designed to maintain the original norms and conditions, which pro-

duces efficiency gains through a single-loop learning process (Argyris 1982). If these very conditions are creating the error in the first place, single-loop learning cannot detect and correct them, but double-loop learning is needed – sometimes it is difficult for organizations to even recognize they have a problem (Easterby-Smith 1997; Argyris 1982). However, people and organizations in general tend to be unaware of their incapability of solving these kinds of problems (Argyris 1982), and may attribute the failure to other people or external factors that cannot be done anything about (Tranfield et al. 2000). A classical example is marketing and manufacturing departments blaming each other when failing to meet sales targets (Senge 1990). Organizations may also have dysfunctional norms, such as hiding bad news from the management, having taboo subjects, or ignoring certain individuals' opinions (Mazutis & Slawinski 2008).

Psychological factors and how the human mind operates may create obstacles for learning. From a psychological perspective, human beings have a tendency to self-protection, they tend to take up defensive routines and avoid conflicts (Mazutis & Slawinski 2008). Defensive routines are shells around our most fundamental assumptions protecting us from pain, but also keeping us from learning (Senge 1990). To protect themselves and avoid confrontation, people are prone to withholding and manipulating information unfavorable to them (Mazutis & Slawinski 2008), impeding learning of themselves but also other organizational members. Related to this, we tend to selectively perceive or ignore signals that contradict with our prevalent understanding of issues and existing mental models (Hall 2010). The prevailing, carefully constructed worldviews are more likely to be supported, not challenged by our minds. Besides, what people say and how they act are two different things – often people claim to have adopted new ideas and practices, but this is not reflected in their actions (Easterby-Smith 1997). Group dynamics may also cause people to avoid hurting each other and thus hide or soften their critique because of loyalty or for the sake of politeness. This is reflected in group thinking, and if someone makes an error, others may want to hide the impact of it to avoid emotional conflict, causing the initiator not learning from his mistake. Moreover, intergroup dynamics, such as polarization of issues, may be counterproductive. (Argyris 1982.) People may also be disengaged in learning when there are personal feelings involved in work-related conflicts, which highlights the role of leadership in solving conflicts before they seriously damage the culture and relationships at work (DeVilbiss 2006).

Organizational structures, norms and procedures may also impede learning or result in dysfunctional behaviors. Learning may not be brought into practice if the individual's role constrains his behavior, for example in form of a narrow job description (Kim 1993). When people only focus on their own position and responsibilities, the bigger entity receives too little attention (Senge 1990). Organizational members sub-optimize their own tasks, failing to optimize the whole system. Audience learning occurs when an individual's learning is not transferred onto the organizational level or not adopted

there, and thus no organizational action results. Superstitious learning may occur when the link between organizational actions and environmental responses exists, but these assumptions are inadequate in reality. Consequently, actions are taken, environmental reactions observed and learning takes place, but the preconceptions about the causal linkages are invalid. (Kim 1993.) Fiol & Lyles (1985) warn that sometimes double-loop learning may create superstitions or norms supporting dysfunctional behavior, and create unwillingness to change. In such case, learning efforts are incorrectly focused on ways of clinging to the current model of operation, game-playing and problem-avoiding (Fiol & Lyles 1985). Learning may also occur under such ambiguity that even though learning exists on behavioral level, no real understanding of the action-outcome causality develops (Kim 1993; Romme & Dillen 1997). This might happen when feedback of the outcomes of actions is suppressed or distorted, or arrives too late (Huber 1991). People tend to have a 'learning horizon', and when their actions have outcomes beyond that horizon, learning from experience is not possible. The most effective learning stems from experience, but we often do not experience the consequences of our actions directly. (Senge 1990.)

Sometimes learning may be situational and not produce any long-term structural effects. The new knowledge developed is forgotten, not sufficiently embedded in the mental models and thus cannot be retrieved from there for later use. Fragmentation of learning occurs when transforming individual learning to organizational learning is ineffective. Individuals possess a great amount of information valuable to the organization, but if they leave, the information is lost with them. If the organizational actions are only based on the instructions of one person or a small group, a possibility of opportunistic learning arises. The group wants to seize an opportunity requiring a new way of operating the business, but cannot wait for the whole organization to change. This results in overriding the existing system of beliefs, values and norms, breaking the link between shared mental models and organizational action. (Kim 1993; Romme & Dillen 1997.) In summary, there is a range of potential obstacles in the way of organizational learning that must be considered in order to avoid the pitfalls.

2.4.4 Feedback – a strategic mechanism linking PMS and learning

Organizational learning is all about change and refining shared theories about business operations, which requires individuals to accept challenging their ideas and to be open for feedback (Mazutis & Slawinski 2008). Mausolff (2004) points out that several models on learning through feedback explain the learning process triggered by stress from negative performance feedback, which subsequently motivates corrective action. The motivating effect of feedback is particularly strong when it is facilitated by comparisons with certain performance benchmarks (Mausolff 2004). To be effective, feedback should be focused on the organization's objectives and competitive priorities, adapt dynamically to any strategic changes, be timely and useful to organizational members, and

be provided on both personal level and regarding the overall process performance (Forza & Salvador 2000).

Crossan et al. (1999) have a dual view on the subject: they describe two separate processes, feedback and feed-forward, as information flows and learning initiatives from organizational to individual level, and from individual to organizational level, respectively. They associate feedback with adaptation and single-loop learning, where organizational norms and practices guide individuals' thinking and set a framework for their behavior. Feed-forward, on the other hand, is a generative double-loop learning process, where new insights are created, shared and institutionalized to the organizational level. (Crossan et al. 1999). Senge (1990) takes a different position using only one concept of feedback. He describes it as a cyclical, rather than one-way process, where every influence is both a cause and an effect. Therefore, the feedback and feed-forward concepts of Crossan et al. (1999) could be coupled under this definition of feedback, as they are just different sides of the same cycle. In this study, Senge's (1990) definition is applied.

Feedback as an organizational learning mechanism is an essential process for learning, facilitating and enabling it. Easterby-Smith (1997) points out feedback on the consequences of organizational actions as the single most important way for organizations to learn. Indeed, feedback enables organizational learning at the executive level (Kaplan & Norton 1996b). Improvement in performance among individuals is much higher when feedback is given, and particularly in learning from experiences, receiving and analyzing feedback is an enhancing factor. (Huber 1991; Mausolff 2004.) In the simple single-loop learning process, it is the feedback provided by the management observations and formal control systems that allows deviations from the implementation plan to be detected and corrected (Kaplan & Norton 1996b). Very often, feedback is related to this exploitative type of learning, where what has already been learned and institutionalized is fed back from the organizational to individual level, affecting how organizational members think, act and learn (Crossan et al. 1999).

In some cases, the feedback from the results of actions is difficult to interpret, and it is not clear for managers why certain results are occurring and what can be done about them (Mausolff 2004). These kinds of ambiguous situations and uncertainty about the reasons of outcomes require a double-loop feedback process. In this context, feedback is given a strategic role – management can develop a strategic double-loop feedback system to test, validate and modify the assumptions embedded in the organizational strategy (Kaplan & Norton 1996b). On a higher cognitive level, feedback from double-loop learning processes guides managers to the right direction by pointing out the mismatches between the organizational actions, environmental outcomes and the planned strategies to achieve goals within the specific context. Therefore, the accuracy of feedback about action-outcome causalities, as well as ensuring the collection and analysis of it, are useful means to facilitate organizational learning (Huber 1991). Tolerating uncer-

tainty is a normal part of the learning process. The uncertainty is easier for managers to handle, if they possess a series of different strategies for interpreting and creating meaning, as the variety of interpretations enhances learning by increasing the elaborateness of it. (Huber 1991; Mausolff 2004.)

Feurer & Chaharbaghi (1995a) claim that though individuals receive feedback from their actions with few problems, organizational level learning is a much more complicated process and thus requires a structured feedback system. The role of feedback-generator is often given to performance measurement systems, because they are designed to give organizational members knowledge about the results of their actions (Feurer & Chaharbaghi 1995a; Mausolff 2004). Kaplan & Norton (1996b) establish a firm linkage between performance measurement, feedback and learning when explaining their ground-breaking strategic performance measurement system Balanced Scorecard: they claim the feedback and learning process is the single most important and innovative aspect in the whole BSC management process. In fact, performance measurement systems and the feedback provided by them can be seen as an organizational learning mechanism of crucial importance.

2.5 Dimensions of organizational learning – a framework

Summarizing the key research findings of learning, it was found that five fundamental orientations of learning are recognized in the literature with differing opinions regarding what constitutes learning – behaviorist, cognitivist, humanist, social and constructivist. Learning may occur in a single-loop, which is a rather mechanistic and shallow process creating incremental learning outcomes within the existing mental frames, or in a deeper double-loop process generating new knowledge and challenging unquestioned assumptions. When focusing the attention on the organizational context of learning, describing how individual learning can be translated into organizational via the process of intuiting, interpreting, integrating and institutionalizing appeared to be the core mechanism, mediated by dialogue.

The two levels of learning, single-loop and double-loop, are processes that can occur on individual level or throughout organization. Similarly, three of the five learning orientations, behaviorist, cognitivist and humanist perspectives, put the individual in focus, while the social and constructivist recognize the importance of social context – and thus view learning as a collective phenomenon. Moreover, organizational learning in particular is concerned with the dynamics of translating learning from individual to organizational level and implementing results of organizational learning by creating structures and procedures guiding individual learning. Therefore, organizational learning and its outcomes can be divided in terms of the level of change that the learning creates – incremental single-loop learning or more radical double-loop learning – and according to

the main actor in focus, individual or collective. Building on these observations, a framework for mapping organizational learning (Figure 5) is created.

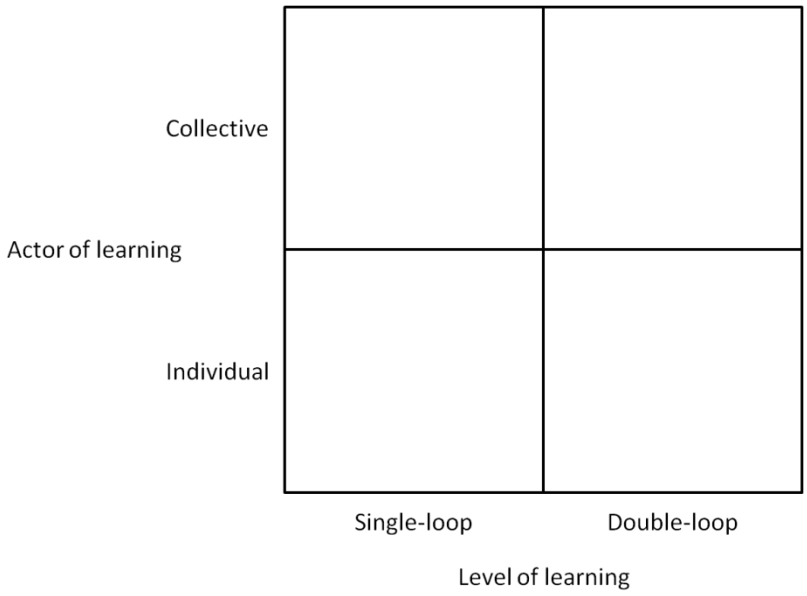

Figure 5. Framework for organizational learning.

This classification helps to clarify the complex nature of learning. In the next chapter, this complexity is well-represented by various researchers and their ongoing disagreement about whether PMS support or suppress learning – it may be that the lack of consensus derives from the ambiguous definitions of learning. The framework is also useful when trying to understand what kinds of learning outcomes organizations hope their PMS to trigger, as the purposes of use as well as the results they are aiming to achieve are likely to vary greatly. By mapping the current practice of PMS and identifying the focus areas as well as perspectives largely left uncovered, gaps and weaknesses in current research can be pointed out. The next chapter expands the theoretical background of this study into performance measurement systems. Having built an understanding about PMS and their various consequences, particularly in terms of learning, the framework drafted in this chapter can be completed into a more comprehensive tool for investigating the linkages between PMS and organizational learning.

3 PERFORMANCE MEASUREMENT SYSTEMS

A classic organizational dilemma regards balancing between control and flexibility (Simons 1995b; Kasperskaya & Tayles 2013). Hardly any organizations can be seen to purely represent control or flexibility values, but they are rather positioned somewhere in between the control-flexibility continuum. Organizations dominated by control values are characterized by stability, predictability and bureaucracy (Henri 2006a). They emphasize productivity and efficiency (Henri 2006a), and are associated with tight control of operations, structured communication channels and restricted information flows (Henri 2006a, after Burns & Stalker 1961). Flexibility value organizations, on the other hand, promote openness, change and adaptability. They highlight growth, innovation and teamwork in bringing up empowerment, commitment and employee development. (Henri 2006a.) Organizations with a cultural flexibility orientation are characterized by loose hierarchy, informal communication, and free exchange of information (Henri 2006a, after Burns & Stalker 1961).

Elements of both cultural archetypes are needed to effectively manage an organization. Too much control will suppress learning and adaptability to change, making it impossible for an organization to survive in a dynamic environment, while too much flexibility will cause organization to lose its strategic direction and fail to implement innovations due to distraction. Management control systems (MCS) are designed to help manage the tension between these two dimensions – flexibility promoting entrepreneurship and innovation, and control supporting rationality, hierarchy and predictable goal achievement (Simons 1995b; Henri 2006a). MCS is a package of controls, comprising control devices for budgeting, planning and goal setting, rewards, feedback loops and performance measurement (Neely et al. 2006; Oliver 2009). Depending on how the MCS is designed, it can be tuned to support not only achieving restrictive control in its narrow sense, but also planning, decision-making, motivating, coordinating, communicating, learning, providing feedback and adapting to environmental changes (Kloot 1997; Oliver 2009). Indeed, as virtually all organizations are forced to operate in a continuously changing environment, achieving control refers to the actions an organization must take to adapt to the changes – gaining control over the change by adapting organizational processes accordingly (Kloot 1997).

Strategy development in a changing environment is a process of learning. It depends on continuous feedback, which can be provided by a performance measurement system. (Feurer & Chaharbaghi 1995b.) Performance measurement systems (PMS), “a set of

metrics used to quantify both the efficiency and effectiveness of actions" (Neely et al. 1995), are an integral part of MCS, created to enable organizations identify their position, clarify goals, detect improvement areas and facilitate reliable predictions of the future (Neely et al. 1995). Performance is the organization's capability to achieve its objectives (Lebas 1995; Neely et al. 1995). Essentially, PMS specify the established goals, identify where the organization is positioned relative to those goals, and determine the courses of actions and processes required to navigate toward those goals under constantly changing conditions. In order to achieve desired progress, it must be planned and tracked with a measurement system to make sure the organization is making progress towards the right direction (DeVilbiss 2006).

Of course, gathering data about the current performance through measurement is no end by itself – a comparison of outcomes to the past, to predefined targets and to external benchmarks is essential to set the results in context (Feurer & Chaharbaghi 1995b). Yet, the purpose of measurement is not just determining how the organization has performed, but also to stimulate actions to improve performance (Parsons 2007). Performance improvements can be achieved by absorbing information about the business operations and the external environment and applying it productively – by learning. Hence, PMS is valuable if it is able to support not only strategy implementation but also formulation. For this purpose, strategic knowledge-generating measures as well as operational measures providing instant feedback of the implementation are needed. (Feurer & Chaharbaghi 1995b.) Moreover, as organizations consist of individuals, an important way to steer an organization to achieve predefined goals is to influence the behavior of individuals by providing feedback and acting as an employee performance evaluation tool (Kloot 1997, after Otley & Berry 1980). PMS comprises the measures, supporting infrastructure and tangible elements, but also the processes of information provision, measure design and data capture (Franco-Santos et al. 2007; Franco-Santos et al. 2012). Therefore, PMS as a part of MCS is the key system and process in fulfilling the organizational strategy.

3.1 Traditional PMS

Traditionally, performance measurement systems have been associated with a mechanistic management style built on rigid control and bureaucracy. This seems logical, as PMS are formal management tools supporting systematic goal achievement and monitoring of performance. PMS started out as mechanistic, passive, coercive and static systems that aimed to achieve stability (Parsons 2007; Henri 2009). They are still often referred to as rigid hierarchical systems that are implemented in a dictating top-down approach, as initially they were developed to the needs of hierarchical organizations operating in relatively stable environments (Feurer & Chaharbaghi 1995b; Modell 2012). The focus was on financial measures and consequently evaluating historical performance (Kaplan & Norton 1996b; Tung et al. 2011). The traditional diagnostic PMS

is built on formal control, and it is designed to monitor and correct deviations from predefined goals by influencing behavior (Henri 2006a; Parsons 2007; Tung et al. 2011). People typically respond to traditional PMS by revising strategy within the current paradigm, which illustrates single-loop learning, as it derives from internal data and is based on repetition (Buckmaster 1999). These features imply that in the contemporary complex and rapidly changing business environment, with increasing needs for future-orientation, learning and innovation, a traditional type of PMS is no longer appropriate.

The diagnostic use and emphasis on financial measures support strategy implementation by translating strategy into action through the feedback mechanism (Henri 2006b; Bhimani & Langfield-Smith 2007; Oliver 2009). Yet, the traditional PMS provides little support for other key strategic processes, like formulating and testing strategy (Kaplan & Norton 1996b), which are a lot more complex and ambiguous processes and in which organizations would need assistance. This is because a traditional PMS does not incorporate predictive measures but focuses on past performance; it also directs its users to correct deviations from the predefined targets, but does not provide information about whether those targets themselves are strategically valid. To overcome these deficiencies, financial metrics have been suggested to be complemented with more predictive non-financial ones when using PMS for strategy development purposes (Kaplan & Norton 1996b; Bhimani & Langfield-Smith 2007). However, the financial perspective in performance measurement is still dominant in organizations (Dossi & Patelli 2006; Tung et al. 2011). Financial measures are a natural choice for performance measurement, because they are relatively objective, take little extra cost to produce and are logically aligned with a strategy that usually pursues financial success (Tuomela 2005). Especially in economically challenging times, companies struggling with their profitability tend to emphasize the financial measures due to the pressure to report good financial results externally (Buckmaster 1999; Dossi & Patelli 2006). Hence, non-financial measures are adopted rather to complement financial ones and to provide more comprehensive insight on them than to substitute them (Dossi & Patelli 2006).

Despite the popularity, a range of problems with purely financial PMS have been recognized. Solely focusing on financial outcomes impedes managers from understanding how well the organization is doing on other strategically important areas, such as quality and service (Feurer & Chaharbaghi 1995b; Tung et al. 2011). Financial measures are based on historical data, and therefore they are untimely, unable to predict future performance and lack the flexibility to change. They describe consequences instead of actual causes, and thus reduce the actionability and provide limited guidance on future actions. (Henri 2006a; Dossi & Patelli 2010; Tung et al. 2011.) Financial measures are cumbersome and complex, inadequate in measuring intangible assets, and prone to manipulation (Buckmaster 1999; Dossi & Patelli 2010). Strict focus on mere financial measures may also encourage chasing short-term wins or sub-optimizing the overall effectiveness (Tsang et al. 1999; Chow & Van der Stede 2006; Henri 2006a), and the

system rather encourages minimizing variations than striving to continuously improve (Neely et al 1995). Kaplan & Norton (1996b) and Butler et al. (1997) also criticize the traditional PMS for the lack of external focus providing understanding of market needs, which may result in a conflict with the long-term strategic objectives. As a response to the need for a PMS that could support management in a more comprehensive set of tasks and recognize the challenges caused by today's competitive environment, the modern version of PMS emerged.

3.2 Features of contemporary PMS

The evolvement of the business environment in terms of increased competition, change, and uncertainty has caused organizations to place new and more extensive requirements to PMS. A simple monitoring and controlling tool is becoming increasingly irrelevant, while being replaced by needs for an enabling system assisting in strategic planning, objective achievement and innovation. A contemporary PMS is more organic, active, enabling and dynamic than its predecessors, evolving from an outcomes surveillance mechanism into an institutionalized process (Henri 2009). PMS should be used more interactively, sending signals throughout the organization to focus attention, activate dialogue and support the emergence of new strategies (Henri 2006b). PMS are expected to expand their scope to enhance knowledge-sharing and learning, and promote flexibility and change (Buckmaster 1999; Dossi & Patelli 2006; Henri 2006a). They must foster cognitive learning by generating knowledge about the value systems and competitive characteristics of the organization, in addition to basic behavioral learning – thereby supporting both strategy formation and implementation (Feurer & Chaharbaghi 1995a; 1995b). The role of PMS as a cornerstone in enhancing communication and learning is also pointed out (Franco-Santos et al. 2007; Pinheiro de Lima et al. 2012).

The new generation of performance measurement systems has been termed strategic PMS (e.g. Chenhall 2005), multidimensional PMS (Tung et al. 2011), comprehensive PMS (Hall 2010) and contemporary PMS (Franco-Santos et al. 2012). A universal concept and definition has yet to be established (Pinheiro de Lima et al. 2012), but the core ideas in taking the traditional PMS to the next level are similar. Therefore, the terms are used quite interchangeably in this study.

According to Kaplan & Norton (1996a), four management processes required for competitive strategy development can be achieved by using comprehensive PMS, including clarifying and translating vision and strategy; communicating and linking strategic objectives and measures; planning, target-setting and strategic initiative alignment; and enhancing strategic feedback and learning. Unless specific attributes are present in the PMS, it will only remain operational and will not be able to support strategic planning (Micheli & Manzoni 2010). However, there is a lack of consensus about what features are necessary and sufficient for such a system (Franco-Santos et al. 2007), but a number

of features commonly pointed out can be identified. Before setting out to examine these attributes, it must be highlighted that even though perceived an improvement to the traditional PMS, a comprehensive PMS is not immune to misuse and manipulation either. The measures can be chosen and interpreted to intentionally demonstrate success without actually making the required changes, and thus PMS may fail to report its own failure (Melnyk et al. 2010). The evolvement of PMS attributes is summarized in Figure 6, and their characteristics are discussed in more detail in the following.

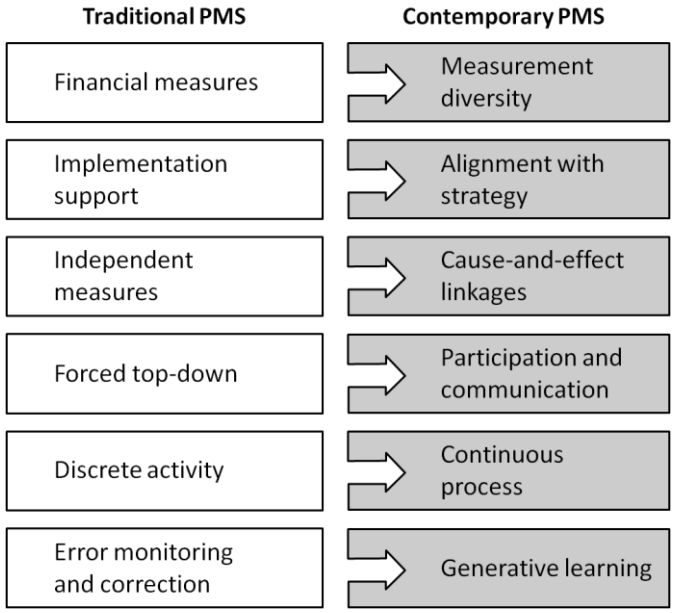

Figure 6. Features of traditional and contemporary PMS.

It is worth noticing that PMS in its traditional form has provided organizations with many benefits in form of increased knowledge and systematic approach to strategy implementation. The development of PMS has not erased the importance of earlier practices, but rather the traditional PMS has been expanded and developed further. Monitoring and diagnosis still comprise an essential part of PMS, but they can be supported and complemented with new elements associated with the comprehensive PMS concept.

Measurement diversity

Perhaps the most significant enhancement to the traditional PMS relates to measurement diversity. The distinct feature of the contemporary PMS is that it captures multiple performance measures related to the most important parts of the organization and is characterized by variety – financial and non-financial measures, lead and lag indicators, short and long term perspectives, subjective and objective, internal and external, quantitative and qualitative measures (Feurer & Chaharbaghi 1995b; Kloot 1997; Henri 2006a; Hall 2010; Pinheiro de Lima et al. 2012) – which should capture the key value-adding activities of the organization (Kaplan & Norton 1996b). Particularly, inclusion of non-

financial metrics is regularly recommended, for example for their ability to track progress in key strategic success factors and support core values (Tuomela 2005), initiate discussion, discover tacit knowledge and make it explicit (Vaivio 2004), and stimulate curiosity, experimentation, emergence of new strategies and learning (Henri 2006a). Chow & Van der Stede (2006) remind that non-financial measures are not free of problems either, and rather than holding them superior to financial measures, organizations should strive to achieve an appropriate balance between them in performance measurement.

Diverse measures have been claimed to increase PMS effectiveness and to help overcome some of the limitations of the traditional PMS, such as sub-optimizing one measure at a time (Kaplan & Norton 1996b; Hoque & James 2000; Tung et al. 2011). The variety of measures aims at having enough information on all the important aspects to capture the full picture of what is going on, providing information of different parts of the value chain, and reflecting the interests of various stakeholders (Feurer & Chaharbaghi 1995b; DeVilbiss 2006; Hall 2008; Dossi & Patelli 2010). The broad-based, carefully selected measures should demonstrate a strategic alignment and increase the amount of relevant information for managers in order to facilitate strategic decision-making (Grafton et al. 2010). Non-financial measures in particular are claimed to outperform the financial ones especially in facilitating implementation and management of new initiatives (Van der Stede et al. 2006; Dossi & Patelli 2010). To provide support for both strategy formulation and implementation, measures reflecting efficiency and effectiveness of operations, but also the ability to act and react, should be included (Feurer & Chaharbaghi 1995b; Ferreira & Otley 2009). However, excessive and overly complex measurement should not be seen as an end as such, but the organizations should strive to create a clear and balanced structure of key performance indicators with a simple and 'good enough' PMS (Johnston et al 2002). Therefore, the key to effective performance measurement is finding the right balance between different metrics, especially financial and non-financial ones (Feurer & Chaharbaghi 1995b). This optimal balance strongly depends on the organization, its cultural values, and the purpose it is willing to use the PMS for. All organizations' needs cannot be satisfied with a single solution, nor do they need the same variety of measures to respond to their needs (Henri 2006a).

The Balanced Scorecard (BSC), developed by Kaplan & Norton, is the most widely used and recognized comprehensive PMS (Bain & Company 2011). It is a management system, comprising both a planning technique and a performance measurement framework (Pinheiro de Lima et al. 2012). It responds to the call for more diversity in measurement by introducing a strategic PMS with measures from four dimensions: financial, customer, internal processes, and learning and growth (Kaplan & Norton 1996b). Noticeably, the financial dimension only forms a minority of the measures, and the emphasis is on other perspectives. A PMS qualifies as a BSC when it has both financial and

non-financial measures, the measures are derived from the strategy, and they are categorized in perspectives (Malmi 2001). Some authors have suggested that in order to respond to the emerging megatrend of environmental and sustainability issues, a fifth perspective of sustainability should be included in the BSC – especially in organizations that strive to deliver additional value through sustainability and use it as a competitive advantage (Tung et al. 2011, after Epstein 2008). The BSC is consistent with the recent trends of "cross-functional integration, customer-supplier partnerships, continuous improvement, and team accountability" (Henri 2006a), and it is appreciated for its easily understandable concept, logical structure and ability to clarify strategy (Ahn 2001).

Alignment

The integration aspect involves making sure that the measures included in PMS are mutually supportive, coherent and consistent with the pursued strategy, as well as the key factors driving the business (DeVilbiss 2006; Oliver 2009; Pinheiro de Lima et al. 2012). A comprehensive PMS is a powerful tool for achieving alignment with the strategy throughout the organization. Alignment is concerned with aiming operations and activities at satisfying the overall organizational goals, and it can be achieved with PMS by subdividing the key processes into sub-level processes and attaching performance measures to each of them, so that they contribute to their part of the whole (Feurer & Chaharbaghi 1995b). PMS is effective in articulating strategy, communicating the strategic goals and the means to achieve them, and it thus enables the employees to understand the goals and how their efforts and accomplishments contribute to them (Kaplan & Norton 1996b; Tung et al. 2011). It has to be recognized that individuals always have their personal interests, which guide their actions in addition to the organizational goals, and this goal conflict has to be addressed in the PMS design by consistency, sequential prioritization and linkages to the reward system (Feurer & Chaharbaghi 1995b; Tsang et al. 1999; Oliver 2009). Indeed, an effective PMS facilitates implementation of the strategy through goal congruence, achieved by communication, incentives and action plans (Dossi & Patelli 2010). The measures should not only be integrated with the strategy and positive outcomes, but also across the value chain and different organizational functions (Hall 2010). By covering different perspectives and integrating them, the strategy is translated into a coherent set of measures, which aids the strategy implementation (Chenhall 2005; Dossi & Patelli 2010). Finally, the PMS should be aligned with the organizational culture and match its unique characteristics (Neely et al. 1995; Rompho & Siengthai 2012). PMS is not independent of the organization, so it should be tailored to the organization's needs (Butler et al. 1997; Tsang et al. 1999; Franco-Santos et al. 2012), particularly to be in line with the strategy (Butler et al. 1997).

Moreover, comprehensive PMS with multiple measures representing different perspectives tend to balance competing strategic priorities and assist in more effective task and resource allocation (Dossi & Patelli 2006), reducing the risk of sub-optimization.

Measures selected to the PMS and their hierarchy encourage attention-focusing on strategic priorities and uncertainties, and help to understand how the various strategic objectives link together (Feurer & Chaharbaghi 1995b; Dossi & Patelli 2006; Henri 2006a). The PMS clarifies and communicates the organization's vision, which focuses and mobilizes the organization (Kaplan & Norton 1996b). It has to be kept in mind, however, that the attention-focusing effects of PMS can also be blinders that prevent management from seeing emerging trends, learning, and changing organizational direction when necessary (Kasperskaya & Tayles 2013).

Cause-and-effect linkages

One of the problems with the traditional PMS was its lack of support for strategic planning processes. Strategy is a cornerstone of every organization, without which sustaining a profitable operating model in a changing environment is impossible, and thus PMS supportive of and aligned with organizational strategy can be a valuable tool. A deeper understanding about how the business operations link to the strategy is embodied in the comprehensive PMS (Chenhall 2005). Kaplan & Norton (1996b) state that in effect, strategy can be simplified into hypotheses about cause-and-effect relationships that represent value creating activities and their outcomes. This is operationalized in PMS by predictive lead indicators driving a certain activity, and lag indicators based on historical data informing about the activity outcomes (De Vilbiss 2006; Kasperskaya & Tayles 2013). If a company takes certain action, it assumes a certain outcome to result from that action. Without believing in specific cause-and-effect relationships, developing a strategy for an organization makes no sense. However the organization defines performance, it must know what causes it (Lebas 1995). By building a system of associated measures demonstrating the causal linkages from operations to fulfilling the strategy, a rational framework for strategy formulation and implementation can be established (Chenhall 2005). The hierarchy of diverse measures should be interlinked in the PMS in a way that changes in operational measures will have a predictable effect on the strategic performance overall (Feurer & Chaharbaghi 1995b). Hence, the organization has the ability to refine its business model, as it can recognize variation trends in the predictive measures before the outcomes appear in the historical indicators (DeVilbiss 2006).

The advantage of a contemporary PMS is that it makes these assumptions of causalities explicit for discussion and scrutiny, which raises the opportunity for double-loop learning. Several authors emphasize the importance of creating PMS so that it tells the logical story of how the organization believes to create value and achieve its goals by linking the measures to each other via causal relationships (Kaplan & Norton 1996b; Kasperskaya & Tayles 2013). This way, PMS can focus organizational attention to key value-delivering activities (Kasperskaya & Tayles 2013). When PMS reflects a strategic causal model, it has a higher coherence with its environment (Rompho & Siengthai 2012). Without valid causal linkages, on the other hand, the PMS is likely to be ineffec-

tive or even counterproductive (Kasperskaya & Tayles 2013). Despite the appealing logic behind a causal PMS, in practice mapping such chains of events has turned out to be very challenging (Tuomela 2005).

Participation and communication

PMS have often been labeled as a project of top management, who have created it with the assistance of some external consultants and then single-handedly imposed the new system on employees. Typically, the personnel have been left outside the project, and have felt that their opinions are not valued and that the management thinks to know their work better than them. However, Oliver (2009) and Neely et al. (1995) say that all those directly influenced by the PMS should be involved in its implementation and operation. To be successful, the design of a PMS should be a participative process (Butler et al. 1997; Pinheiro de Lima et al. 2012), backed up by open and extensive dialogue. It should be transparent and formulated to motivate rather than control to win over the employees (Feurer & Chaharbaghi 1995b). Implementing a contemporary PMS requires not only creating the measurement system but also a shift in thinking and a cultural change, which may be faced with resistance from the personnel (DeVilbiss 2006; Modell 2012). For the staff to be more receptive and committed to the new system, it should be listened to, consulted, and involved in the iterative PMS design process (Butler et al. 1997; De Haas & Kleingeld 1999). A contemporary PMS by nature is interactive – it essentially requires participation and involvement from everyone it influences, as learning stimulated by debate and challenging ideas is one of its key value propositions. Therefore, personnel empowerment should be utilized to enhance problem identification and improvement interventions, and initiative-taking should be encouraged to avoid too narrow and restrictive employee roles (Phusavat et al. 2009).

Overcoming these obstacles and getting the full potential out of PMS relies on communication. A higher involvement has been shown to contribute to PMS effectiveness in strategy implementation (Dossi & Patelli 2006), because of the cognitive and motivational factors including better communication and utilization of knowledge, higher commitment and sense of responsibility, and less resistance to change (Kleingeld et al. 2004; De Vilbiss 2006; Dossi & Patelli 2006). Especially non-financial measures can facilitate dialogue throughout the organization and provide a better understanding about the connections between actions and strategic objectives – a more comprehensive PMS provides richer and more complete feedback (Dossi & Patelli 2006; Henri 2006a; Hall 2008). Non-financial indicators can be used as a forum, stimulating debate, argument, and new insights and action plans generating organizational learning. It is easier to trace non-financial measures to strategic actions and they are more actionable, as they translate the strategy into operational terms. (Dossi & Patelli 2006; Henri 2006a.) Their ability to foster dialogue is based on their forward-looking nature, the capture of key performance drivers, and the depth of information they provide compared to financial ones.

In addition, they have the ability to attract attention widely among managers, because they are also used for other purposes than performance evaluation, such as market analyses and production planning, and this can lead to fruitful discussion between experts from various responsibility areas with different perspectives of looking at things. (Dossi & Patelli 2006.)

Continuity

A distinct feature of contemporary PMS is that it is not used diagnostically but interactively, meaning that the performance measures are frequently evaluated and analyzed to learn what kinds of actions lead to better performance (Dossi & Patelli 2006). Like Kloot (1997) points out regarding a specific PMS, the BSC, the continuous improvement approach is embedded into it. For PMS to effectively improve organizational performance it cannot be a one-time activity, but a continuous process to which time and effort is devoted. This applies not only to carrying out the measurement and monitoring in a frequent and continuous manner, but also to the validating and refining the actual PMS structure and measures themselves to maintain the appropriateness of the PMS. (Tranfield et al. 2000; DeVilbiss 2006; Tung et al. 2011.) In a sense, organizational learning must be made into a routine (Tranfield et al. 2000). It is necessary to keep the PMS refreshed to reflect the changes in the organization's objectives and learning requirements, which derive from the changes in the environment. Otherwise PMS will lose its touch to the environmental conditions and thus also its effectiveness. (Feurer & Chaharbaghi 1995b; Pinheiro de Lima et al. 2012.) Strategy formulation should be thought of as a continuous learning process (Feurer & Chaharbaghi 1995a), and as a contemporary PMS aims to create value in strategy formulation, it should be constantly evaluated and developed in line with strategic change as well. The PMS must be revised, developed and managed on an ongoing basis (Feurer & Chaharbaghi 1995a; Tung et al. 2011; Pinheiro de Lima et al. 2012). The relevance of the PMS can be maintained by adding or deleting measures, and changing the target or definition of the measures (Henri 2009). However, it remains questionable how and when the PMS should be altered, and how these modifications can be combined with the measurement continuity viewpoint (Tuomela 2005).

Seeing measurement design as an ongoing task also promotes a mindset of long-term commitment, as the system is developed better and better. Particularly, the process view of PMS associates with continuous improvement, change management and organizational learning (Pinheiro de Lima et al. 2012) – when measurements are continuously improved, an opportunity for continuous learning also emerges (DeVilbiss 2006). The continuous use of PMS for monitoring and subsequent corrective action is illustrative of single-loop learning, while the frequent development and redesign of the PMS overall represents double-loop learning through strategic feedback (Pinheiro de Lima et al. 2012). Single and double-loop learning requirements thus reflect the need for organiza-

tions to balance incremental improvement and radical innovation. Complete learning will only occur if feedback is integrated into every level of the strategic change process. (Feurer & Chaharbaghi 1995b.)

Learning

When deciding to adopt a more comprehensive PMS, organizations often hope it to provide them with enhanced support tools fostering creativity and flexibility instead of forcing a simplification of the operations in form of measures. Contemporary performance measurement is no longer performed just to find out how the organization has done (DeVilbiss 2006). An important aspect of the comprehensive PMS is ensuring that the organization learns by providing information on how to improve, which can create a sustainable competitive advantage (Senge 1990; Chenhall 2005; DeVilbiss 2006). In fact, Kaplan & Norton (1996b) claim that feedback and learning are the most important processes in their PMS, the BSC. A successful PMS produces opportunities for learning and self-improvement for the manager, measurer and the one being measured (Lebas 1995). The traditional PMS as a monitoring device with only historically-oriented financial measures will create adaptive learning at best, but effectively generating new learning can be achieved with a more contemporary PMS including also predictive measures (Kaplan & Norton 1996b; DeVilbiss 2006). Performance measurement systems are not only useful in implementing adaptive action, but they also create value by generating change and innovation – they are not only a way to survive, but a source of improvement, facilitating the improvement of the whole organization (Lebas 1995; Henri 2006a).

Oliver (2009) posits that to activate organizational learning, PMS should be structured to support decision-making, facilitate rapid and effective learning and unlearning, and enable the acquisition and development of knowledge. As mentioned before, PMS can be used diagnostically, characterized by mechanistic control, or interactively, with elements associated with a flexible, innovative culture (Henri 2006b). Interactive control systems can be employed to stimulate organizational learning and development of new ideas by acquiring relevant information and applying it to management practices (Simons 1995b; Buckmaster 1999). The PMS should respond to the learning requirements of the organization both regarding strategy formulation and implementation, which require single and double-loop learning respectively (Feurer & Chaharbaghi 1995b). When the PMS provides information freely and frequently (Kloot 1997) and non-financial measures are included, it can foster learning and bottom-up emergence of new strategic patterns in the discussions on various organizational levels (Vaivio 2004; Henri 2006a; 2006b).

3.3 Consequences of performance measurement

Research has shown that measuring and managing performance can benefit organizations in many ways. Quite obviously, it can enhance organizational performance (Franco-Santos et al. 2012). It can assist in the formulation, implementation and review of the organizational strategy, and strengthen corporate brand and reputation by helping to communicate achieved results to stakeholders (Feurer & Chaharbaghi 1995b; Micheli & Manzoni 2010). Oliver (2009) points out the mindset of continuous improvement that performance measurement can promote. Most interestingly for this study, several researchers pinpoint the positive effect it has on fostering organizational learning (e.g. Chenhall 2006; Henri 2006a; Micheli & Manzoni 2010).

Not all PMS consequences are positive ones. Even if the PMS is designed appropriately, it cannot be separated from the human action required to interpret the data it produces – and the human factor always involves mistakes, subjectivity and cognitive limitations. Reasons for the failure of PMS may also include low management involvement, technical complexity, and misunderstandings regarding the system design requirements and managers' cognitive styles (Argyris 1982).Therefore, it has to be carefully weighed whether the benefits of PMS outnumber the disadvantages, because in worst case, the PMS is not only ineffective but harmful and can seriously inhibit learning (Sinclair & Zairi 1995; Micheli & Manzoni 2010).

Table 3. Summary of PMS consequences (adapted from Franco-Santos et al. 2012).

Dimensions of PMS consequences

People's behavior	Organizational capabilities	Performance
• Strategic focus • Role clarity • Participation • Communication • Motivation • Job satisfaction • Culture • Learning	• Strategy processes • Communication • Learning • Control device	• Individual • Collective

In their inclusive study, Franco-Santos et al. (2012) classify the consequences of comprehensive PMS into three categories: people's behavior, organizational capabilities and performance-related outcomes. This framework, illustrated in Table 3, is applied as a starting point.

3.3.1 People's behavior

PMS has been found to have a range of effects on people's behavior, referring to consequences in the actions and reactions of employees as well as the cognitive mechanisms

behind them (Franco-Santos et al. 2012). Performance measures and measurement processes as elements of a strategic control system can be employed to influence attitudes and behavior (Azofra et al. 2003; Pinheiro de Lima et al. 2012). In general, people tend to be defensive, unaware of their mental limitations, engage in dysfunctional group and inter-group dynamics, hide their errors and reinforce their existing beliefs (Argyris 1982). The research indicates PMS to have both positive and negative consequences on people's behavior.

Strategic focus

PMS may provide strategic focus by facilitating discussion about strategy and concentrating management efforts on the organizational priorities (Franco-Santos et al. 2012). It has the ability to direct managerial attention to strategically most important issues. Performance measures and feedback derived from them also guide the actions of managers (Pinheiro de Lima et al. 2012). This way PMS encourages goal congruence, which means communicating and aligning employees' personal goals with organizational goals by clarifying on which dimensions performance is desired (Tuomela 2005; Tung et al. 2011). It also supports managers in making decisions and rationalizing them to themselves and their superiors (Wiersma 2009), because by basing their decisions on PMS, they can demonstrate that their decisions are founded on the overall strategy. In fact, PMS both facilitates managerial decision-making by providing extensive information to feed learning, and influences and directs managerial decision-making by setting performance objectives in form of measures. As the managers' performance is evaluated by the PMS measures, they will adapt their actions to create the largest possible impact on those measures. (Grafton et al 2010.) In addition, PMS supports managers in coordinating actions in order to pursue the strategy effectively (Wiersma 2009).

Role clarity

The effects of PMS on role clarity have been studied by Hall (2008), who claims that PMS can increase how clearly managers perceive their roles, i.e. how well they feel they are aware of the expectations set to them. This is because PMS information increases their knowledge of the strategic goals and how their actions affect the achievement of those goals (Hall 2008). By reflecting the measures in their decisions, they can justify their actions to themselves and others, reducing the ambiguity of how they are expected to act. PMS can also be used to assign decision capacity (Azofra et al. 2010), which can increase role clarity through explicit communication of responsibilities. Nevertheless, some authors argue that the use of PMS may actually reduce managers' role understanding and what is expected from them in cases where the PMS is associated with high complexity. A goal conflict may arise when multiple goals are set by PMS and people perceive them to be difficult and incompatible to be achieved simultaneously (Cheng et al. 2007).

Participation

PMS has the potential to increase cooperation and participation both within the organization and in external supplier relationships (Franco-Santos et al. 2012). A participative PMS promotes teamwork (Azofra et al. 2003) and supports development of common understanding, which facilitates collaborative decision-making (Godener & Söderquist 2004). Through increased participation and careful communication the resistance to change among employees is also likely to decline, and PMS thus has the ability to produce consensus and settle conflicts (DeVilbiss 2006; Modell 2012). Participation in PMS design and use is actually essential, as without it the PMS are perceived as constraining or even coercive, eroding the positive effects attainable with it (Fried 2010). Indeed, when a PMS is implemented top-down without participation of stakeholders it affects, problems and resistance are likely to arise (Malina & Selto 2001). An interactive PMS has a positive impact on employee involvement and commitment to the performance measurement and management process, as the development and implementation of a contemporary PMS is an iterative and consultative process (Butler et al. 1997; Franco-Santos et al. 2012). When employees are encouraged to participate in PMS design and use, and their opinions are heard and valued, their acceptance and commitment to the PMS approach is likely to be higher.

Communication

PMS should not only be used for diagnostic purposes, but to activate dialogue and initiate collective debate about strategic performance results. PMS has the potential to positively impact fair information distribution, as well as enhanced knowledge acquisition and sharing, (Mahama 2006). This can be supported with the inclusion of non-financial performance indicators into the PMS, as they complement financial metrics by capturing performance drivers instead of outcomes (Dossi & Patelli 2010). A contemporary PMS can foster communication, dialogue, and information organizing and distribution throughout the organization (Azofra et al 2003; Parsons 2007; Kasperskaya & Tayles 2013), which in turn fosters problem-solving and generative organizational learning (Mahama 2006; Dossi & Patelli 2010). PMS can be used to initiate more intensive communication, but it also moderates the organizational discussion. This is because it requires and provides information that influences how people think, act and interact, which affects the organizational communication processes (Franco-Santos et al. 2012).

Motivation and job satisfaction

The motivational effects of PMS have been recognized by several authors. Franco-Santos et al. (2012) summarize that PMS increases people's motivation to achieve strategic objectives of the organization. Godener & Söderquist (2004) suggest that PMS can

increase motivation for tasks for which there is no immediate return. The effect of PMS use on motivation is particularly strong when employees have participated in the PMS design process, and an element of benchmarking against competitors or other business units is involved (Godener & Söderquist 2004).

Monetary rewards linked to PMS increase motivation on certain conditions (Decoene & Bruggeman 2006; Micheli & Manzoni 2010). PMS is likely to have a negative effect on motivation if linked to a reward system, if the measures have low controllability and alignment with organizational strategy (Decoene & Bruggeman 2006). A contemporary PMS comprising a set of non-financial measures may bring about perceptions of measurement subjectivity and uncertainty, as it can be difficult to objectively assess non-financial performance. This may reduce the trust to the PMS and cause people to question their validity. (Franco-Santos et al. 2012.) The subjectivity is a larger problem when measurement outcomes are directly linked to monetary rewards (Burney et al. 2009). The problem of subjectivity is real, especially due to the fact that complexity and subjective nature of some measures may lead to judgmental biases and decrease employees' perception of justice regarding the PMS (Burney et al 2009; Franco-Santos et al. 2012). For example, the way in which the measures in the PMS are organized affects managers' judgments (Lipe & Salterio 2002). Moreover, business unit managers tend to rely prominently on financial measures that are common to all units and used in their compensation evaluation instead of more unique, non-financial measures not affecting their rewards (Lipe & Salterio 2000).

Malina & Selto (2001) conclude that a motivating PMS must include challenging but attainable targets for measures that are controllable and related to meaningful rewards, and it must promote feedback, dialogue and participation. Effective strategic alignment, achievable with PMS, can also empower and intrinsically motivate managers (Decoene & Bruggeman 2006). The rich feedback provided to managers by a comprehensive PMS may also increase psychological empowerment, which is a motivational construct referring to the increased intrinsic motivation (Hall 2008). Being involved in the PMS design process also increases satisfaction with the program (Kleingeld et al. 2004). Furthermore, using PMS measures for performance evaluation has a significant positive effect on employee satisfaction when employees believe the system to be fair, valid and well-defined, and they trust their supervisors (Lau & Sholihin 2005; Burney et al. 2009; Rompho & Siengthai 2012). The feedback provided by PMS is also important, as employee satisfaction and intrinsic motivation are found to increase when feedback on outcomes and process results is received (McAfee et al. 1995; Hall 2008, after Ilgen et al. 1979). Thus, to effectively influence employee behavior through motivation, PMS should be linked to reward systems but also organizational culture (Decoene & Bruggeman 2006; Henri 2006a; Rompho & Siengthai 2012), to harness both external and intrinsic motivating mechanisms.

Culture

Organizations cannot be separated from their cultural background and their historical path. Therefore, the organizational culture and management style strongly affect how the PMS is designed, what measures are included in it, how it is implemented and used, and what kinds of outcomes can be attained with it (Bititci et al. 2006; Henri 2006a; Dossi & Patelli 2010; Franco-Santos et al. 2012). Organizational culture affects the diversity of measurement, how deeply the PMS is integrated into the organizational processes, and the purposes that management uses it for (Henri 2006a). Thus, organizational culture and management style affect the success or failure of the PMS (Bititci et al. 2006). The organizational culture moderates the effects of PMS (Franco-Santos et al. 2012), because the organization's cultural background influences perceptions about what the measured results mean, and it encompasses judgment, interpretation and learning (Parsons 2007).

However, the influence goes both ways; PMS can also shape the organizational culture (Tuomela 2005; Bititci et al. 2006; DeVilbiss 2006; Franco-Santos et al. 2012). An interactive PMS can generate cultural change and shape the management style into a more participative and consultative one (Malina & Selto 2001; Bititci et al. 2006). On the other hand, it has been suggested to encourage short-termism, dysfunctional behavior, purposeful misinterpretation and political gaming (Miller 1993; Ahn 2001; Micheli & Manzoni 2010). In fact, a successful PMS implementation often requires cultural change, which may be faced with resistance and create conflicts and tensions between individuals and teams (DeVilbiss 2006; Jazayeri & Scapens 2008; Franco-Santos et al. 2012). For example, managers may oppose the adoption of PMS because it can increase their workload, make their performance more visible and thus subject to critique, and shake the power structures of the organization (Tuomela 2005). This is likely especially when it encourages questioning and challenging the prevailing paradigm and is used to justify the resources given to a specific function (Miller 1993; Buckmaster 1999; Micheli & Manzoni 2010).

Cultural change may stem from the learning that the PMS generates, as individuals change their values as a result of their reflection of the learning process (Feurer & Chaharbaghi 1995a). PMS can also help to create an organizational culture of learning (Oliver 2009). To successfully generate learning effects, PMS and the organizational culture should support creativity – a traditional control approach can deskill and alienate employees (Kloot 1997).

The use of PMS supports cultural change by guiding people's actions and reinforcing desired behaviors, values and beliefs (Jazayeri & Scapens 2008). On the other hand, Melnyk et al. (2010) claim that PMS can promote and sustain the adoption of a specific paradigm, which serves the organizational pursuits when PMS is implemented in line

with organizational culture, but which can also create inertia and prevent strategic change. This may occur especially when the PMS has a historically good track record, it is complex and pervasive, competing objectives are not organized according to their priority, responsibilities are not assigned, and the system validity is rarely reviewed (Melnyk et al. 2010; Micheli & Manzoni 2010). Thus, it is important to understand that the PMS cannot be implemented without considering the organizational culture – they need to support each other. Cultural changes are always massive transitions in values and the way of thinking, and if the culture must be transformed to be able to realize the benefits from a contemporary PMS, these changes must be managed with discretion.

Learning

PMS can support and feed managers' cognitive processes (Franco-Santos et al. 2012). Research in cognitive and social psychology indicates that PMS can trigger individual learning and assist managers in building mental models of the business through its informational outcomes (Buckmaster 1999; Parsons 2007; Micheli & Manzoni 2010). It also supports socialization and learning in a social context by influencing interactions that characterize social processes (Mahama 2006). PMS improves the accessibility to information, which facilitates learning (Godener & Söderquist 2004). Often learning is a byproduct of PMS use, even if it is not pursued intentionally (Vandenbosch & Higgins 1995).

Hall (2011) brings organizational learning effects to discussion by explaining how PMS can help managers confirm or build their mental models, which refers to single and double-loop learning. He observes that using PMS can enhance both types of learning, especially mental model confirmation. It provides feedback and empirical observations to prompt testing of mental models about how activities, operations and performance are related (Hall 2011, see also Vandenbosch & Higgins 1995). Also mental model building, analogous with double-loop learning, can benefit from PMS and consequently facilitate strategy formulation and development (Buckmaster 1999; Hall 2011). This occurs when employees use PMS information to validate their assumptions about the desired goals and the causal relationships underlying their activities (Fried 2010). However, as people are prone to selective perception and information filtering, the cues given by PMS suggesting new ways of thinking may easily be ignored (Hall 2011).

A comprehensive PMS with multiple metrics, including also non-financial ones, can foster learning and building up employees' competencies (Rompho & Siengthai 2012). Specifically, in the relationship between headquarters and subsidiaries or different business units, non-financial indicators can activate learning through relative performance evaluation and sharing best practices (Dossi & Patelli 2010). When appropriate feedback mechanisms are built into PMS, they can act as scoreboards and help managers learn how to improve their performance most effectively through tracking their own

performance (Wiersma 2009). Hence, it is the feedback element that provides executives with the capability of learning (Feurer & Chaharbaghi 1995a; Kaplan & Norton 1996b; Tuomela 2005; Oliver 2009; Tung et al. 2011).

3.3.2 Organizational capabilities

Organizational capabilities refer to the consequences PMS has on processes, activities and competences enabling the organization to perform and create competitive advantages (Franco-Santos et al. 2012).

Strategy processes

The literature recognizes the positive impact of PMS on strategy processes, such as strategy development, implementation, review and alignment (Oliver 2009; Franco-Santos et al. 2012). PMS provides an understanding of the organization's current market position, supports building of market orientation (Henri 2006b; Tung et al. 2011), and encourages the involvement of managers in strategy formulation (Dossi & Patelli 2010; Pinheiro de Lima et al. 2012). The construction phase of PMS can help to clarify the strategy (Tuomela 2005). PMS supports strategy implementation due to its capability of interpreting the strategy into more actionable operational terms, allocating resources (De Geuser et al. 2009; Dossi & Patelli 2010), ensuring strategy-oriented action planning (Ahn 2001), as well as by promoting systematic objective achievement through monitoring of progress towards predefined goals. PMS also approaches strategic thinking as a continuous process, not a discrete activity. Hence, it promotes managers' engagement to strategy processes, particularly continuous validation and review of the current strategy and its match with environmental conditions. (De Vilbiss 2006; De Geuser et al. 2009; Tung et al. 2011; Pinheiro de Lima et al. 2012.) It should also be pointed out that control systems are capable of not only supporting strategic change by passively reflecting changes in strategy, but also of proactively shaping strategic changes (Dent 1990). Finally, a diverse PMS with non-financial indicators can play an important role in achieving strategic alignment by providing guidance, prioritizing and coordinating actions through communication. As a result, all parts of the organization are ensured to work towards the common strategic objectives. (De Geuser et al. 2009; Dossi & Patelli 2010.)

Kasperskaya & Tayles (2013) posit that PMS may also act as strategic "blinders" instead of "binders". This may occur when the PMS is applied to assist strategic planning in a prescriptive way – first the strategy is formulated and then executed. A prescriptive approach to strategy views it as a controlled process rather than an emergent, iterative and constantly developing path. As a simplification of the causalities prevailing between organizational actions and outcomes, the model that PMS represents might give too crude a picture of reality and thus act as a "blinder", hiding informal and emergent information such as rumors and gossip. (Kasperskaya & Tayles 2013.)

Communication

As pointed out previously, rich and open dialogue is an effective way of generating and spreading learning within an organization. Effective and free-flowing communication can also be seen as an organizational capability, both in terms of well-functioning communication processes and a culture that fosters knowledge-sharing. According to a number of researchers, PMS can support communication and stimulate dialogue when it is used interactively (Butler et al. 1997; Ahn 2001; Godener & Söderquist 2004; Tuomela 2005; Henri 2006; Dossi & Patelli 2010). PMS can act as a platform for organizational discussion regarding strategic uncertainties and underlying assumptions about business operations. Causally logical and structured PMS can also significantly reduce the cognitive complexity among managers and serve as a communication tool due to its ability of organizing, displaying and distributing knowledge. (Kasperskaya & Tayles 2013.) PMS is also advantageous in external communication, as by communicating achieved results to stakeholders it can strengthen the organization's brand and reputation (Micheli & Manzoni 2010). However, Malina & Selto (2001) and Henri (2006b) present evidence of that PMS can be an ineffective communication tool if it is not designed in a participative manner and used interactively. They found out that a PMS imposed to employees with a top-down approach created dissatisfaction, and reduced trust and motivation (Malina & Selto 2001). This implies that the PMS benefits related to communication are not available in the traditional PMS assembly.

Organizational learning

The opinions about PMS effects on organizational learning capabilities are mixed. Some researchers argue that eventually, the only competitive advantage sustainable in the long term is the organization's capability to continuously learn (Senge 1990; Nonaka 1991), and PMS can potentially help to develop enduring capabilities of continuous improvement through feedback – essentially learning (Kaplan & Norton 1996b; Parsons 2007; Pinheiro de Lima et al. 2012). On the other hand, management control systems in general are said to increase organizational inertia and maintain inappropriate paradigms (Van de Ven 1986; Miller 1993; Fried 2010). According to Chenhall & Morris (1995) a number of researchers accuse formal administrative processes in general of being inconsistent with innovativeness, as they promote a mechanistic decision-making approach instead of responsiveness to environmental change. A rigid PMS that is pervasive and rarely reviewed can create organizational inertia and paralysis, acting as an obstacle for change (Micheli & Manzoni 2010). The data PMS produces lacks the contextual richness of rumors and intuition (Kasperskaya & Tayles 2013), and may be biased towards those stakeholders with strongest influence (Feurer & Chaharbaghi 1995b). PMS has also been accused of filtering and manipulating information so that it gives an incom-

plete or distorted picture of reality (Feurer & Chaharbaghi 1995b; Kasperskaya & Tayles 2013), which impedes organizational learning.

Consequently, some authors argue that PMS suppresses innovation and learning (Batac & Carassus 2009; Micheli & Manzoni 2010), or that it is only capable of supporting single, not double-loop learning, as the PMS essentially were designed for error identification and correction (Argyris 1982). Hence, it should be understood that the ability of an organization to learn can be seriously inhibited by a poorly designed PMS that does not support continuous adaptation (Sinclair & Zairi 1995), but strategically managing PMS may allow organizations to develop capabilities of learning and continuous improvement (Pinheiro de Lima et al. 2012).

PMS does not only support learning among individual organizational members, but also organizational learning occurring on a collective level. If PMS is used interactively, and its underlying assumptions are open for questioning and debate, it can engage organizations in strategic learning (Kasperskaya & Tayles 2013). PMS promoting organizational learning is supportive to developing and building up employee competences, which contribute to organizational capabilities (Rompho & Siengthai 2012). Organizational learning as responding to environmental change can be facilitated by the design and use of appropriate management control systems, because they share a common ultimate purpose: both are aiming at organizational change or adaptation to achieve an environmental fit (Kloot 1997).

An effective PMS does not only enable strategic learning, but also generates it (Fried 2010). Traditional diagnostic PMS inform managers when there is a lack of fit with the environment and actions are not in accordance with plans, resulting in solutions at operational level and thus creating incremental single-loop learning effects (Simons 1995b). These learning effects derive from the study of sources that cause deviations from planned goals (Dervitsiotis 2004). Thus, also basic control mechanisms are able to produce some degree of organizational learning (Batac & Carassus 2009). Yet, single-loop learning is not enough to aid strategy in the long term – it is adaptive learning, simply assimilating existing knowledge (DeVilbiss 2006; Fried 2010). In fact, it has been observed that business units, where the management system logic is based on simple diagnostic feedback, achieve lower performance results than those with interactive control systems (Bourne et al. 2005; see also Braam & Nijssen 2004).

When PMS are used interactively, they can encourage development of new ideas and innovation (Marginson 2002). The effects PMS go beyond adaptation to generative double-loop learning and actually creating new knowledge, when PMS provides predictive data, and helps managers to sense opportunities and change direction through dialogue and surveillance in the performance management process (Kloot 1997; DeVilbiss 2006). The feedback and information collected by the systems can be used to challenge

the existing paradigms and appropriateness of strategy, and the development and use of PMS may enhance the organization's learning capability (Kaplan & Norton 1996b; Kloot 1997; Fried 2010).

As the majority of learning in organizations is single-loop by default, PMS seem to be more useful for organizations when it is designed to prompt double-loop learning (Vandenbosch & Higgins 1995). However, Argyris & Schön (1978) and Feurer & Chaharbaghi (1995a) argue that single-loop learning is a prerequisite for double-loop learning to occur. Besides, Bisbe & Otley (2004) argue that the innovation-enhancing effects of interactive PMS are likely to occur only in organizations with a low level of innovation – when the level of innovation already is high, PMS tends to suppress it. Henri (2006b) finds that the diagnostic and interactive uses of PMS, producing single and double-loop learning effects, both complement and compete with each other. They are both needed for an organization to effectively balance operational efficiency and innovation to guarantee future profitability. Yet, they take up the organization's cognitive capacity from each other (Henri 2006b). Being able to optimally balance the tensions between diagnostic and interactive uses of PMS; exploitation of previously learned and exploration of novel capabilities; control and flexibility; can be seen to constitute an organizational capability as such (Henri 2006a; 2006b; Grafton et al. 2010). An organization may have an innovative vision about its desired future state, but it must 'live to get there' (Melnyk et al. 2010).

Control device

Very often, PMS are perceived as devices of corporate control, which prominently reflects the traditional way of using them as opposed to the contemporary applications. It cannot be denied, though, that the role of PMS in providing a tool of control is still valid. Even though the contemporary PMS are expected to be flexible, a certain degree of control is required to ensure the organization adapts to its environment and takes systematic action enabling it to fulfill its purposes (Kloot 1997). Control is needed to influence the behavior of individuals so as to ensure organizational members are working productively towards these goals, but it must be balanced with freedom to innovate how to achieve those objectives most efficiently (Kloot 1997). A contemporary PMS with its non-financial measures is suggested to enhance coordination and control by increasing visibility, comparability, dialogue and alignment between organizational units (Dossi & Patelli 2010; Cruz et al. 2011). Kraus & Lind (2010) disagree, claiming that even when the top management has a comprehensive PMS available, they still tend to rely dominantly on financial metrics and thus a multi-dimensional PMS adds little value to corporate control. In summary, even though the contemporary PMS has been developed towards a more organic, flexible and enabling solution, the control capability is still a significant element in it and appreciated by managers.

3.3.3 Performance

Generally, PMS is often recommended for enhancing organizational performance either directly or indirectly (Hoque & James 2000; Davis & Albright 2004; De Geuser et al. 2009; Grafton et al. 2010; Tung et al. 2011), but the research evidence is mixed (Bourne et al. 2005). Performance can be related to improvements in both financial and non-financial terms, across all organizational levels – individual and collective. Another fairly common viewpoint is whether the investigation is about actual performance or perceived performance improvements, and interestingly these two streams have produced quite different results. (Franco-Santos et al. 2012.)

Collective

When looking at the organization or a business unit as a whole, the research about PMS effects on reported performance has produced mixed results (Bourne et al. 2005; Franco-Santos et al. 2012; Kasperskaya & Tayles 2013) – some authors (e.g. Hoque & James 2000; Azofra et al. 2003; Ittner et al. 2003; Davis & Albright 2004; de Geuser et al. 2009) state that comprehensive PMS have a positive impact on accounting and stock market performance as well as non-financial performance, while others, like Ittner et al. (2003), find only weak relationships or no relationship at all. Ittner et al. (2003, see also Malmi 2001), however, report that the majority of the respondent companies who claimed to use BSC did not rely on causal business models. Davis & Albright (2004) point out that this might be the reason for the observed weak relationship between PMS and performance, because causality is one of the key elements of a contemporary PMS. Tung et al. (2011) claim that aligning PMS with the organizational strategy has a positive influence on organizational performance in general. However, the design, implementation and use of PMS, especially an interactive one, ties up resources, is costly and time-consuming, and its actual benefits are seldom systematically tracked (Johnston et al. 2002; Tuomela 2005; Henri 2006b; Micheli & Manzoni 2010). PMS may thus require a high level of maintenance and be impractical (Feurer & Chaharbaghi 1995b). There are also inconsistencies regarding perceived PMS effects on performance (Franco-Santos et al. 2012; Kasperskaya & Tayles 2013), but most researchers observe a positive relationship (e.g. Ittner et al. 2003; Chenhall 2005; Henri 2006b; Van der Stede et al. 2006; Grafton et al. 2010). This satisfaction with the PMS is not, however, translated into improved stock-market performance (Ittner et al. 2003). Group or team level performance may also get support from PMS when the system is comprehensive, team members participate in PMS design and target setting, there is mutual accountability within teams, feedback is provided, and team measures constitute a meaningful part of individual incentives (Jones et al. 1993; Kloot 1997; Scott &Tiessen 1999).

How PMS actually affects organizational performance has been explained through various mediating factors. Some authors claim that PMS enhances organizational perfor-

mance through individual and organizational learning (Kloot 1997; Fried 2010), while others find no evidence that innovation would mediate the relationship between PMS use and performance (e.g. Bisbe & Otley 2004). Johnston et al. (2002) found that in organizations with a successful PMS the focus of the system was on managerial action, particularly driving improvement and fostering organizational learning. Feedback received from performance measurement report is suggested to result in performance improvement (Jones et al. 1993; Forza & Salvador 2000). Hamilton & Chervany (1981) find that performance improvements from PMS can be delivered through process improvements – like skill and knowledge development, feedback and motivating (Tung et al. 2011). PMS can also contribute to performance by developing organization's capabilities (Henri 2006b) and enhancing cooperation (Mahama 2006). Franco-Santos et al. (2012) summarize that the use of a comprehensive PMS in itself is not enough to improve organizational performance, but it is affected by how the PMS are designed, used and refined.

Besides, a range of moderating factors influence the relationship between PMS and performance, such as environmental uncertainty, organization structure, culture, information systems, top management support, style of use and PMS alignment with organizational strategy (Braam & Nijssen 2004; Bourne et al. 2005; Tung et al. 2011; Franco-Santos et al. 2012). Thus, it seems evident that PMS do have the potential to influence performance, but this effect depends largely on the circumstances (Bourne et al. 2005). The comprehensiveness and diversity of performance measures employed also have a positive relationship with organizational performance (Van der Stede et al. 2006; Grafton 2010).

Individual

On individual managerial level, cognitive and motivational mechanisms are commonly used to explain the PMS impact on managerial performance (Hall 2008; Franco-Santos et al. 2012). A well-designed PMS with multiple but clearly prioritized measures is found to positively influence managerial performance through reduction of goal conflict (Cheng et al. 2007), improvement of role clarity and psychological empowerment (Hall 2008), lower job-related stress (Shields et al 2000), and promotion of learning (Hall 2010). PMS also provide feedback on outcomes and process results, which increases employee job satisfaction, and consequently translates into improved individual performance (McAfee et al. 1995; Kleingeld et al. 2004; Rompho & Siengthai 2012). Particularly, receiving personal feedback increases the individual performance of managers (Forza & Salvador 2000). Vandenbosch & Higgins (1995) also found a positive relationship between managers' mental model building (i.e. double-loop learning) and managerial performance, but not between mental model confirmation and performance.

3.4 Types of PMS usage and their relation to learning

In the previous chapter, a broad range of potential PMS consequences on different dimensions were identified. Interestingly, research has found contradictory evidence on many of the outcomes. For example, some authors claim that PMS are able to foster learning, while others argue that a PMS suppresses learning or is only able to support single-loop learning. Therefore, it has to be pointed out that all of the consequences hardly occur simultaneously when using PMS in a specific organization – the consequences and their magnitude are strongly influenced and moderated by different contingent factors. These factors can be external, such as environmental uncertainty and competitive situation, or internal, like organization structure, culture and leadership style (Franco-Santos et al. 2012). One of the most important factors influencing the nature of outcomes of PMS is the role PMS is given in the organization and the purpose it is intended to be used for (e.g. Tuomela 2005). Regarding the example of organizational learning, Kloot (1997) claims that the organization's capability to learn through management control systems depends on MCS characteristics and how it is used.

There are many variations of PMS classifications available in the literature. Some authors have approached the classification task from the perspective of different roles given to performance measurement systems. These include viewing PMS as an answer machine, learning machine, ammunition machine and rationalization machine (Henri 2006a, after Burchell et al. 1980), or, following a similar logic, score card, problem solving, attention focusing and learning, and legitimization (Vandenbosch 1999). Simons (1995b) classifies PMS into diagnostic, interactive, belief and boundary systems, while Henri (2006a), building on the work of his predecessors, synthesizes the roles of PMS into monitoring, attention focusing, strategic decision-making and legitimization. The problem with most of the four-dimensional classifications is that the PMS used by an organization may have elements from different roles (Tuomela 2005). For example, the same PMS could be used to focus organizational attention but also to legitimize management decisions, acting as an "ammunition machine" and a "rationalization machine" simultaneously. Thus, these classifications are not mutually exclusive, nor are they collectively exhaustive, at least judging by the differences between the classifications of researchers.

Hall (2011) and Fried (2010) point out several PMS types along two dimensions, such as interactive and diagnostic, formal and informal, flexible and inflexible, and enabling and constraining systems. Among these, the concepts of interactive and diagnostic PMS roles are widely recognized in the literature (Tuomela 2005), and many authors apply them in their research. Additionally, any PMS with all its elements hardly represents strictly one or the other, but rather the same system is used in both ways for different purposes (Henri 2006a). Yet, the underlying core purpose, performance measurement culture, and the very nature of the system are likely to fall into either category. Diagnos-

tic and interactive uses of PMS also strongly reflect the classical dilemma of management control systems – optimally balancing organizational control and flexibility – discussed at the beginning of this chapter. Therefore, the split into interactive and diagnostic PMS role is applied also in this study.

The diagnostic use of PMS matches the feedback role of the traditional PMS (Henri 2006a). It promotes the sense of clarity and comfort (Dent 1990), and motivates and directs goal achievement by focusing on deviations from predefined performance standards and correcting them (Henri 2006a). The diagnostic use of PMS provides an essential tool for monitoring and coordinating implementation of intended strategy (Bisbe & Otley 2004; Henri 2006a). It guarantees predictable goal achievement aligned with strategy, and thus diagnostic use of PMS provides boundaries and restricts risk-taking (Simons 1995a; Henri 2006a). Diagnostic PMS represents a mechanistic control for tracking, reviewing and supporting consistent performance, and is associated with tight control of operations and strategies as well as structured communication channels and restricted information flows (Henri 2006a; Henri 2006a, after Burns & Stalker 1961). As a result of the tracking and monitoring efforts, a diagnostic PMS provides feedback on performance. The formal feedback allows fine tuning to optimize process efficiency and to match the targets more precisely (Simons 1995a), and this error correction process inherent in a diagnostic PMS represents single-loop learning (Argyris & Schön 1978; Tuomela 2005). Diagnostic use, embodying formalized routines, guides behavior and hence facilitates learning (Widener 2007). Thus, diagnostic use of PMS is likely to be supportive of single-loop learning, but due to its reliance on tight control and preset standards of performance, it is unlikely to promote innovation or more generative double-loop learning. It rather reaffirms the old rationales for action (Dent 1990). In fact, though the ability of diagnostic PMS to produce single-loop learning effects is recognized by many, some researchers deny all learning effects and claim that diagnostic PMS rather encourages dysfunctional behavior and distortion of information, which impedes learning (Henri 2006a).

Interactive use of PMS is closely associated with contemporary and more comprehensive PMS, and it emphasizes learning and opportunity-seeking rather than control (Bisbe & Otley 2004; Tuomela 2005). A PMS used interactively is an organic control that fosters communication processes and mutual adjustment of organizational actors. It can be used to share emerging information, and foster creativity and curiosity throughout the organization. (Dent 1990; Simons 1995a; Henri 2006a.) While using PMS diagnostically may limit it into a measurement tool, interactive use of PMS expands it into a strategic management tool (Kaplan & Norton 2001). Simons (1995a) points out four features distinctive to the interactive PMS. They focus on continuously changing information identified as strategically important, and the top management is actively involved in them (Simons 1995a). Interactive PMS provide information that demands frequent and regular attention from all the organizational members (Simons 1995a;

Bisbe & Otley 2004). The data generated by interactive PMS is best interpreted and discussed in cooperative face-to-face dialogue between members from different organizational levels, and it sparks discussion regarding the underlying assumptions, data and plans (Simons 1995a).

These features highlight dialogue and experience-sharing, as well as openness and employee involvement. When organizational members on all levels respond to the opportunities and threats revealed by interactive use of PMS, ideas can flow freely, organizational learning occurs, and new strategies may emerge bottom-up (Bisbe & Otley 2004; Henri 2006a). An interactive PMS provides stimulation for thought processes and a forum for sharing insights and challenging ideas. Thus, interactive PMS guide and provide input to innovation. (Bisbe & Otley 2004.) Through them, managers engage in decision-making, focus organizational attention and promote organizational learning (Simons 1995a). While the discussion generated by scorekeeping and diagnostic use of PMS can lead to corrective action and single-loop learning at best (Argyris & Schön 1978; Vandenbosch 1999), the biggest advantage of an interactive PMS is its ability to support organizational dialogue and consequently activate learning (Simons 1995a) – particularly double-loop learning, or identification of emergent strategies and reformation of existing paradigms (Simons 1995a; Tuomela 2005). As the essence of double-loop learning is in challenging the unquestioned truths, an interactive PMS ideally should engage organizational members in strategic dialogue and question the validity of the PMS (De Haas & Kleingeld 1999). It enables organizations to creatively adapt to changing competitive environments (Bisbe & Otley 2004). There are increasing demands among organizations that a successful PMS should exceed the limits of a measurement tool and also assist in strategy formulation and review processes. Therefore, an interactively-used PMS that generates learning about the competitive environment as well as emerging threats and opportunities might be the answer to their needs.

The research about PMS effects on organizational learning was previously mentioned to have produced contradictory outcomes. However, the differing claims do not take into account the PMS role and style of use. It seems those studies arguing that management control or performance measurement systems suppress learning and innovation focus exclusively on diagnostic uses of PMS, while those finding PMS supportive of learning have captured the essence of interactive PMS (Bisbe & Otley 2004). It would be a crude simplification to say that all the positive and enabling effects of PMS can only be attained through the interactive use of PMS. However, many of the identified potential PMS outcomes demand openness, dialogue, flexibility and employee involvement - characteristics more closely associated with the interactive use of PMS. Besides, Bourne et al. (2005) found business units using PMS interactively to outperform those using it diagnostically. It might be that an interactive style of using PMS responds better to the contemporary problems that organizations face in the increasingly competitive environment due to its ability to activate double-loop learning (Vandenbosch & Higgins

1995). Still, several authors (e.g. De Haas & Kleingeld 1999; Widener 2007; Ferreira & Otley 2009) believe that both types of uses are essential for organizations, as diagnostic use is perceived to constitute a prerequisite and a necessary structure for interactive use to be effective, in a similar way that single-loop learning is a prerequisite for double-loop learning (Argyris & Schön 1978). Therefore, Henri (2006a) believes that the use of PMS in practice ranges from mostly diagnostic to a combination of diagnostic and interactive. Widener (2007) suggests it is the strategic conditions that set information processing needs demanding PMS to be used both diagnostically and interactively to capture its full potential. These arguments are in line with the findings that the majority of organizational learning is single-loop (Vandenbosch & Higgins 1995).

3.5 PMS and learning – completing the framework

In chapter 2, a framework for understanding organizational learning effects was created. Along with the increase in understanding regarding PMS, the linkages between learning and PMS have also become more visible. It seems clear that it is not the implementation of PMS in an organization and using it that creates learning as such – the learning effects, like all the other PMS consequences an organization may experience, strongly depend on the nature of use of the PMS. Though PMS may be given different roles in an organization, the fundamental types of usage can be divided to diagnostic and interactive. In line with this, it was concluded that a diagnostic PMS and the activities associated with it clearly represent the single-loop learning logic. This notion was backed up by previous research (e.g. Argyris & Schön 1978; Tuomela 2005). Similarly, an interactive way of using PMS was found to enable double-loop learning (Simons 1995a; Tuomela 2005; Henri 2006b). These findings can now be incorporated into the organizational learning framework (Figure 7).

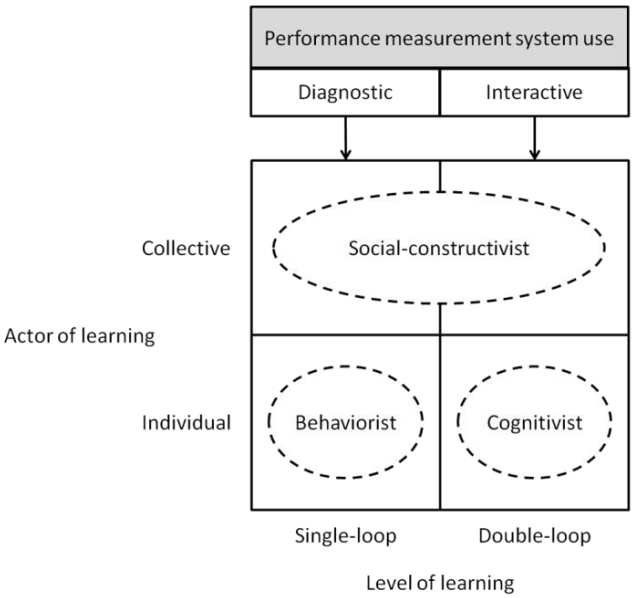

Figure 7. Framework for PMS and organizational learning.

This framework will provide structure and guidance for the next chapter, where the field of research regarding the linkages between PMS and organizational learning will be mapped. It will help to clarify whether there is a specific focus area within the research community and, on the other hand, identify possible gaps in current knowledge. The framework can also bring structure to the discussion, where differing opinions prevail about whether PMS is able to support learning or not, by specifying what actually is meant by learning in a particular study (mere adaptation or generation of new knowledge) and what kind of PMS is in question (mostly used diagnostically or interactively). It may be that by considering these factors, the lack of consensus within the field looks smaller – disagreeing researchers may just be speaking with different definitions of PMS and organizational learning.

It is possible that the disagreement about the learning effects of PMS stems from the underlying assumptions of what learning fundamentally is – or the learning orientation adopted. An interesting point regarding learning theories has been made by Feurer & Chaharbaghi (1995a; 1995b). It has been stated earlier that single-loop learning is related to strategy implementation and double-loop learning to strategy formulation (Feurer & Chaharbaghi 1995b), or as Widener (2007) formulates, highlighting the essential cooperation of the two uses of PMS, "the diagnostic system is used to communicate the strategy that emerges through the interactive system". Knowledge-generating learning that supports strategy formulation represents cognitive learning, while adaptive learning related to strategy implementation and execution is behavioral (Feurer & Chaharbaghi 1995a; Batac & Carassus 2009). This implies that the fundamental nature of single and double-loop learning could be different, based on totally separate learning theories. It also arouses the need to be able to translate cognitive learning into behavioral (Feurer & Chaharbaghi 1995a), or to effectively harness double-loop learning to produce a positive change in performance. Again, it seems that single and double-loop learning are interconnected, and together they enhance and feed each other. The cognitivist and behaviorist learning theories focus on the learning of individuals (Chiva & Alegre 2005), and thus Feurer & Chaharbaghi (1995b) in their work explain how PMS can support single and double-loop learning processes of individuals.

However, organizational learning cannot be simplified into individual learning processes, as it constitutes more than the mere accumulation of organizational members' learning (Argyris & Schön 1978; Fiol & Lyles 1985). Therefore, it appears that the point of departure for a collective organizational learning theory is different from the processes of individual learning in organizations. Moreover, it was found that organizational learning depends on processes of translating and transferring knowledge between individuals, groups and organizational level, as well as a cyclical process where organizational members create shared meaning together by intuiting, interpreting, integrating and institutionalizing (Crossan et al. 1999). In fact, the most widespread models of organizational learning process by Crossan et al. (1999) and Huber (1991) both include

the collective interpretative mental construction process in an explicit manner. Despite the different emphases in the interpretation process, there is a strong consensus about the social nature of meaning creation in organizational learning. (Mausolff 2004.) The key to organizational learning thus lies in organizational social activity, where dialogue mediates a collective learning process and organizational members construct and iterate their shared mental representations of the surrounding reality. As Dixon (1997) puts it, organizational learning is a process "through which an organization constructs the meaning", and that it is the whole learning-related process rather than the accumulated knowledge that forms organizational learning. This implies quite clearly, how the roots of collective learning on organizational level are in social-constructivist learning theory. The fact that the fundamental understanding of learning varies according to the actor and the depth of learning might explain the stark contradictions and disagreement of the PMS-learning relationship within the field. Even though the underlying learning orientation is rarely made explicit in the literature, it will be interesting to test the framework and analyze, whether they are indirectly expressed in the foundations of the studies.

4 THE RELATIONSHIP BETWEEN PMS AND ORGANIZATIONAL LEARNING

In the two previous chapters, phenomena of organizational learning as well as the use of PMS were examined. Several linkages were identified along the way, suggesting that these two constructs do share important linkages to a high degree. For instance, the feedback provided by PMS and the dialogue around strategic issues it sparks were shown to be crucial for organizational learning, and the capability of PMS to create both adaptive and generative learning was recognized. By understanding these various connections, it is possible to enhance the practices of utilizing performance measurement systems for learning purposes and discover new or unexplored ways to support learning.

The relationship between PMS and learning is complex and multifaceted, and it involves a number of mediating and moderating factors. This is illustrated by the constant debate and argument within the field about whether PMS supports or deters organizational learning. Regarding the usage of PMS, it emerged that the type and purpose of use are likely to strongly affect what kind of learning outcomes can be expected from a PMS. In this chapter, the various linkages between the two constructs as proposed by a number of researchers are elaborated. Studies focusing on this issue specifically are examined, but it will also be interesting to see what kind of theoretical standpoint has been applied in those studies where the relationship between PMS and organizational learning is used as a premise and is expressed more implicitly.

Bisbe & Otley (2004) have studied the effect of management control systems on product innovation. A similar disagreement regarding the relationship of these two constructs is prevalent also in their field. PMS is an important element of MCS, and innovation is logically associated with learning as a potential consequence, particularly with generative double-loop learning. Therefore, the practical typology created by Bisbe & Otley (2004) for mapping the research of MCS and product innovation may well be applicable as a point of departure to this study as well. They have recognized that the debate about the issue has four distinct streams. Firstly, some authors see that a formal MCS is not relevant in terms of product innovation and tend to ignore its possible impact. On the other hand, MCS is suggested to be incompatible with and deter successful product innovation. A third line of research believes MCS and product innovation can coexist, claiming that formal control is needed to balance excessive innovation efforts and to ensure the ideas are effectively translated into productive practical solutions. Finally, there is a growing body of research suggesting that MCS can indeed support and

foster innovation, acting as discussion forums and prioritizing organizational action. (Bisbe & Otley 2004.)

4.1 Negative PMS effects on organizational learning

Quite often, PMS is accused of impeding organizational learning and suppressing creativity and innovation. Formal structures and control systems aim at preserving existing practices and focusing organizational attention, and they are claimed to support a mechanistic decision-making approach, causing blindness to other issues and inattentiveness to environmental changes and innovation needs (Van de Ven 1986; Chenhall & Morris 1995). Consequently, as organizational members' receptiveness to environmental cues and trends decreases, they become myopic and too focused on achieving the articulated immediate goals to learn. Close supervision for control purposes ensures that the organizational member's behaviors follow the rules and procedures (Ouchi 1977), but when people feel they are being controlled, their creativity is demotivated and suppressed (Amabile 1998). PMS also have the disadvantageous ability to hide issues. The selection of measures and areas to be measured reflects the views about what should be looked at and what can be ignored, and their use reinforces these perceptions. What is perceived irrelevant or not expected to change is not measured – thus, broader emerging megatrends in the environment may be left unnoticed. Unexpected environmental changes or shocks are also easily rationalized away as being temporary or out of the management's control instead of reexamining the original premises. (Miller 1993.)

Like Amabile (1998) points out, many studies imply that business imperatives like productivity, coordination and control are opposites to creativity and thus impossible to achieve simultaneously. If an organization chooses to compete on rapid adaptability, innovation, flexibility and continuous learning, it is forced to do so at the cost of losing control and maximum efficiency. An administrative system used for control and coordination is not well suited to identifying or responding to emerging opportunities, whereas when such a system is designed for flexibility, resources are inevitably underutilized. Thus, tight control and simultaneous flexibility and capacity for effective learning are incompatible. (Miles et al. 1978.)

Particularly, the view of MCS or PMS suppressing organizational learning is linked to the traditional type of PMS and its diagnostic use for monitoring purposes. Indeed, it seems that many researchers opposing the claim that PMS could support learning are, in fact, taking a very narrow view of performance measurement systems and understand them only in the role of a diagnostic monitoring device, ignoring the concurrent ways of using PMS interactively to spark debate and facilitate strategy formulation. Similar observation is made by Bisbe & Otley (2004, after Simons 1990), who state that those studies suggesting hindering effects of MCS on innovation are partial, as they only study formal uses of diagnostic MCS and fail to capture the presence of interactive uses

of MCS as well as the dynamic tension between these two styles of use. For instance, many recent studies (e.g. Henri 2006b; Batac & Carassus 2009; Micheli & Manzoni 2010; Kasperskaya & Tayles 2013) who recognize the capability of PMS to foster learning admit that on certain conditions it can also impede learning. They specify that the style of PMS use, namely diagnostic use, may prevent learning effects from being achieved (Henri 2006b; Micheli & Manzoni 2010), and that solely focusing on financial indicators in performance measurement is detrimental for learning (Micheli & Manzoni 2010). Bureaucratic and hierarchic organizations are also likely to use PMS to exert bureaucratic and cultural control, associated with slow and authoritative decision-making, hindering learning in organizations (Batac & Carassus 2009). If the PMS is imposed top-down and not in an interactive fashion, and its underlying assumptions are not opened for debate and questioning, PMS may act as strategic blinders and suppress learning (Kasperskaya & Tayles 2013).

It is notable that none of the recent studies completely deny the ability of PMS to facilitate organizational learning. Rather, it appears that only the earlier studies in the field claim PMS is a hindrance to learning, while more recent ones see that while this impeding effect may occur when PMS is not used correctly, PMS generally are able to foster learning when its features and style of use are favorable. As Parsons (2007) formulates, in the contemporary performance measurement practice measuring has been put into the service of learning and improvement, rather than using it for control. Consensus about PMS having positive learning effects seems to have developed over time as the understanding of contextual and use-related factors has increased and the conceptualization of PMS has broadened.

Therefore, it appears that it is far too simplistic to state categorically that formal control systems, including PMS, suppress organizational learning without specifying, what actually is meant by control and learning and how the performance measurement systems are used in practice. First of all, the notion of control systems has evolved – it is not only about tight surveillance, but includes also balancing and enabling elements. As Batac & Carassus (2009, after Kloot 1997) point out, management control is not only considered with budgeting and accounting systems anymore, but its scope has expanded into many different systems operating in concert and performing a part of management control, while centering on the new purpose of organizational learning. The new essence of management control is embodied in Simon's (1995a) theory of levers of control, in which he argues that complete management control includes not only diagnostic systems, but also interactive, boundary and beliefs systems.

Secondly, learning might be perceived differently by different authors, and some may regard learning to have occurred in conditions where others do not. For example, single-loop learning represents a behavioral and more generic type of learning (Feurer & Chaharbaghi 1995a) that is widely present in practically all organizations monitoring

their performance and adapting their actions accordingly (Vandenbosch & Higgins 1995). As the vast majority of organizational learning is single-loop and it is indeed double-loop learning that generates new knowledge and promotes innovation, authors might ignore single-loop learning and overlook it, while focusing exclusively on double-loop learning. Thus, when they state that PMS is unable to produce learning, they may in fact exclusively mean the generative double-loop type, ignoring the single-loop learning that even a basic PMS, as claimed by Franco-Santos et al. (2012), almost inevitably creates. A case in point is the definition of learning by (Fiol & Lyles 1985), who dismiss the idea of behavioral (i.e. single-loop) learning and claim it is mere adaptation, not learning in its deeper meaning.

Finally, the understanding of whether PMS helps or hinders learning depends on the recognition of the different effects of diagnostic and interactive style of PMS use on learning. The traditional conceptualization of PMS was excessively focused on monitoring, financial measures and tight control, which are elements likely to suppress learning (Kaplan & Norton 1996b; Henri 2009; Tung et al. 2011). However, the conceptual definitions of control have recently expanded so that PMS and organizational learning can be linked, which seemed to be impossible under the original paradigm (Batac & Carassus 2009). The role of contemporary PMS is much more comprehensive, and it is expected to provide flexibility, facilitate dialogue and support strategy formulation and learning (Feurer & Chaharbaghi 1995a; Buckmaster 1999; Dossi & Patelli 2006; Pinheiro de Lima et al. 2012). Hence, increased evidence of how PMS can be used more interactively has probably also influenced the traditional view that PMS would not be supportive to organizational learning.

4.2 Positive PMS effects on organizational learning

4.2.1 PMS use enables and creates organizational learning

While a number of early studies on control, performance measurement and organizational learning take the standpoint that using PMS suppresses learning, more recent studies tend to suggest the opposite. Franco-Santos et al. (2012) claim quite daringly that when using PMS, it is nearly impossible to avoid organizational learning. A number of researchers (Kaplan & Norton 1996b; Vandenbosch 1999; Johnston et al. 2002; Pinheiro de Lima et al. 2012) recognize learning as an important, or even the most important consequence of PMS use. PMS can provide the fundamental platform upon which organizational learning can evolve (Chenhall 2005), act as an organizational learning mechanism (Oliver 2009), and be able to generate learning through feedback and stimulation of problem-solving (Mausolff 2004). To trigger learning among individuals and on organizational level, PMS has to be strategically managed and its measures aligned with the organizational culture and vision (Parsons 2007; Pinheiro de Lima et al. 2012). Dossi & Patelli (2010) found in their study of head office and subsid-

iary relationships that particularly the non-financial indicators in the contemporary PMS support dialogue and learning. Indeed, like demonstrated in chapter 2 while discussing the cyclical learning model, it was shown that PMS can provide support and input for all the phases of the organizational learning cycle.

There are also researchers who do not clarify how PMS actually creates organizational learning, but imply this feature more indirectly, for example by claiming that PMS may positively contribute to creating a cultural "learning environment" by providing an explicit representation of the business and the organizational model (De Geuser et al. 2009; Yongvanich & Guthrie 2009). Similarly, the learning effects pervading the whole organization are not always directly supported, as some studies only discuss PMS-generated learning effects on individual level, leaving their opinion about the relationship between PMS and organizational learning obscure. A few examples are provided by Wiersma (2009), Forza & Salvador (2000) and Shields et al. (2000). They highlight the self-monitoring and individual learning outcomes produced by the feedback mechanism built into the PMS, as well as the participative, interactive style of control in favor of increased information sharing. Lebas (1995) also states that PMS can create learning among individuals – the manager, the measurer and the person being measured – but also feed the discussion as a basis for continuous organizational level improvement, tying the individual and organizational modes of learning together.

Even though strategic PMS is sometimes claimed to 'ensure' that organizations learn (Chenhall 2005), many authors emphasize that learning does not automatically follow from PMS implementation (Fried 2010), but certain preconditions must be met. For example, Dossi & Patelli (2010) specify that it is the interactive use of PMS that generates learning about action-outcome relationships by engaging organizational members to frequent analysis of performance indicators. The purpose of interactive PMS use is to sense when the moment is right for changing direction and seizing emerging opportunities, and it can be valuable in identifying and solving problems that stem from more fundamental changes in the business environment (Kloot 1997). The importance of interactive style of control for learning is emphasized by a number of researchers, including Kasperskaya & Tayles (2013), Srimai et al. (2011), Batac & Carassus (2009), Micheli & Manzoni (2009) and Henri (2006b). They found that the interactive use of PMS supports organizational learning by expanding opportunity-seeking, stimulating dialogue and focusing organizational attention on strategic priorities. Micheli & Manzoni (2010) speak in favor of the use of non-financial indicators as a part of PMS, as they have the ability to effectively promote strategic alignment, organizational learning and knowledge-sharing. They add that a PMS should not be used in isolation but in combination with other mechanisms and acting in interplay with the organizational culture (Micheli & Manzoni 2009). Kasperskaya & Tayles (2013) also contend that the assumptions underlying the strategy embodied in the PMS must be left open for discussion and challenging to be able to achieve learning effects. Thus, organizations imple-

menting PMS must pay close attention to the process of designing, implementing and using PMS to be able to capture the potential benefits of it.

Clearly, a broad consensus prevails in the field that PMS are able to produce organizational learning consequences, at least when used in an interactive and comprehensive manner rather than diagnostically. Thus, it is interesting to bring up the contradictory views of Widener (2007). Indeed, she has found completely opposite results in her study about control mechanisms and their impact on organizational learning. In the study, no relationship between interactive use of performance measures and organizational learning was found, but on the contrary a positive relationship between diagnostic use of PMS and learning was observed. In fact, the interactive use only had an impact on learning when acting through the diagnostic control systems. It is suggested that it is actually the structured formal systems that bring life to and harness the learning benefits of the interactive use of PMS. She also argues that Henri (2006b), who found a negative relationship between diagnostic control and organizational learning, has applied too narrow a definition of diagnostic control in his study. Moreover, she claims that in fact Henri (2006b) also found positive relations between diagnostic PMS use and learning in his analysis regarding the dynamic tension between diagnostic and interactive use. (Widener 2007.) This exception directs attention to the future study of style of PMS use and how it affects organizational learning outcomes. It might be that the PMS impact on learning proves to result from the complex interplay of different types of controls instead of the interactive PMS use simply creating all the learning benefits.

The possibility that diagnostic and interactive uses are not optional but can be applied in combination to reap optimal benefits from the PMS has received attention also from Henri (2006b), who suggests a fruitful dynamic tension between different styles of use, and Grafton et al. (2010), who find a relation between the feedback and feed-forward uses of PMS. Feurer & Chaharbaghi (1995a; 1995b) emphasize the balancing tension between consistency and change, efficiency and effectiveness, and thus an alignment between single and double-loop learning. Also Kloot (1997) points out that the seemingly contradicting notions of control and flexible learning capabilities are not necessarily so distant at all, as they share the objective of change and organizational adaptation to the environment. This approach to understanding PMS-learning relationship is discussed further in chapter 4.3.

The use of PMS can be an enabling factor in strategic learning processes (Fried 2010), creating the cultural environment, dialogue and systematic analysis approach required for learning to arise (De Geuser et al. 2009; Micheli & Manzoni 2009; Oliver 2009). PMS with its measures also provides a valuable mechanism for information collection to feed organizational learning, and thus enables it to occur (Chenhall 2005; Grafton et al. 2010). Yet, PMS is not only an enabler or a moderating factor for learning, but its use can actually create learning among organizational members as such. Franco-Santos

et al. (2007) claim that organizational learning is almost inevitable when using a PMS due to the organizational self-reflection in the PMS design phase as well as the accumulation of experience through its use. In the context of R&D process, Godener & Söderquist (2004) recognize that organizational learning through the use of PMS is manifested on three distinct levels: learning how to better adhere to the existing process as well as how to define and take corrective action based on diagnosis i.e. single-loop learning; learning how to improve the process; and learning how to improve the measurement itself, which together represent double-loop learning. Finally, the relationship between organizational learning and PMS is not one-directional but recursive (Kloot 1997). PMS can enable learning as a contextual factor and contribute to the array of features needed to create an organization conducive to learning, and using it can actually make people learn about the business operations and the causalities of its interaction with the environment. However, PMS is also affected by the learning occurring in the organization. (Kloot 1997.) When organizations and their members learn, they are able to develop the PMS and the way it is utilized to better serve the strategic needs of the organization. In fact, already the implementation process of the PMS can involve learning among the developers and users, leading to refinement of objectives (Hamilton & Chervany 1981). PMS affects organizational learning, but organizational learning can also result in reshaping the PMS measures and objectives, and accommodating updated vision and strategy – it can be both a result of a strategic learning process and a condition for it (Kaplan & Norton 1996b; Kloot 1997; Batac & Carassus 2009; Fried 2010). Hence, PMS can act as a mediator translating the results of organizational learning into improved business performance through re-definition of more appropriate objectives, and implementing new strategies to achieve them more effectively.

4.2.2 Does PMS create single or double-loop learning?

Research on organizational learning has addressed the existence of two distinct levels of learning: single and double-loop. A large part of the literature regarding the learning effects of PMS ignores these two levels, dealing with organizational learning as one construct instead, which may partly explain the contradictory views about the relationships between the concepts. To achieve a more precise understanding of what types of learning effects PMS actually can create, many authors have examined single and double-loop learning effects of PMS separately, and found that depending on the PMS conceptualization, it can produce different types of learning (Fried 2010).

The two types represent the organizational capability to adaptively change the implemented methods to achieve objectives and to change the way in which the objectives themselves are defined (Batac & Carassus 2009). PMS can support these both: single-loop learning by enabling managers to monitor and adjust strategy implementation, and double-loop learning by letting them make fundamental changes in the strategy itself, in case inconsistencies are observed between the assumptions and the PMS-produced performance information (Kaplan & Norton 1996b; Bourne et al. 2000). Kloot (1997), Oli-

ver (2009) and Ferreira & Otley (2009) all state that a sound learning system essentially requires both single and double-loop learning. As Feurer & Chaharbaghi (1995a) add, lower level learning feeds and produces information for higher level learning. Yet, single-loop learning is simply adapting to the environment and assimilating existing data; to achieve capabilities needed for dynamic change and double-loop learning that actually generates new information, an effective PMS must stretch beyond a mere monitoring device (De Vilbiss 2006). A traditional diagnostic PMS typically creates a response of strategy modification within current organizational norms, but a contemporary comprehensive PMS is able to support more radical changes in the course of strategy by feeding the information about the measurement outcomes back to the system for review (Buckmaster 1999). Feurer & Chaharbaghi (1995a; 1995b) connect single-loop and behavioral learning as well as double-loop and cognitive learning, and emphasize that PMS should foster both behavioral and cognitive learning in order to successfully translate novel ideas into improved operations. Incremental and radical innovation are both critical for long-term survival.

The capability of PMS to create single-loop learning appears quite trivial, as performance measurement directly fulfils single-loop learning requirements of tracking predictable goal achievement and detecting lack of environmental fit. PMS are designed for control, which is associated with the conformity and rigidity supported by single-loop learning (Henri 2006a). A number of studies suggest that being a formal control system, PMS can only foster single-loop learning in organizations at best – a monitoring and error-correcting process is hardly going to stimulate creativity and innovation. It has been claimed that organizations and their formal control systems are fundamentally designed to detect and correct errors from predefined standards of performance, and therefore double-loop learning is unlikely to occur. Thus, the substantial majority of organizational learning overall is single-loop. (Argyris 1982.) It is not only the essence of formal management control systems that intrinsically supports single-loop learning, but also the psychological attributes of human beings. We are prone to reinforcing our existing beliefs, hiding our errors, and selectively perceiving environmental cues (Argyris 1997; Mazutis & Slawinski 2008). Routines and information systems that once contributed to an organization's success also adversely influence the mental flexibility of organizational members. By homogenizing and entrenching their cognitive structures, they make double-loop learning even more difficult. (Miller 1993.)

In his case study, Ahn (2001) observed learning effects resulting from the use of a balanced scorecard. He noticed that the cause-and-effect chains embedded in the BSC can trigger comparison of the assumptions made and the actual outcomes, but it still remained unclear whether the BSC could be used to validate the original premises (Ahn 2001). In other words, the empirical study found evidence of single-loop learning, but double-loop learning effects were yet to be proved. The finding gets support from Miller (1993), who observes that because PMS monitor and evaluate managers' performance

by the established standards, they are seldom reassessed, and when they are, they are rather refined than radically challenged (Miller 1993).

Hall (2011) approaches the issue with concepts of mental model confirming and building, analogous with single and double-loop learning. His findings show that the use of a comprehensive PMS helps managers confirm their mental models and hence achieve single-loop learning. However, even though he admits that also double-loop learning can be attained through the use of PMS, he emphasizes that these higher level effects are only likely to be achieved under certain conditions – specifically, when managers have a short organizational tenure and the organization is small or medium-sized. (Hall 2011.) Miller (1993) agrees, claiming that experienced managers form strong opinions due to the positive reinforcements they have collected over time, and thus it is difficult for them to adopt new ideas and learn. Hence, the studies of Hall (2011) and Ahn (1993) support Argyris (1982) in that even though there is potential for organizations to double-loop learn by using PMS, it is rather unlikely to occur and the overwhelming majority of organizational learning occurs on single-loop level.

If the PMS is established to serve the purpose of sustaining the organization's existing theory of business, its development will not trigger strategic learning processes (Fried 2010). Nevertheless, a number of researchers firmly believe that PMS does have the potential to create double-loop learning. What is common to the studies that recognize the capability of PMS to also produce higher-level is that they understand the concept of PMS comprising not only the diagnostic monitoring but also the dialogue and cooperative, continuous development surrounding it – the interactive dimension. Single-loop learning is linked to the traditional diagnostic PMS use, while a mature comprehensive PMS with interactive features is required for organizations to double-loop learn (Buckmaster 1999; Dervitsiotis 2004; Tuomela 2005; Rompho & Siengthai 2012).

Organizational structure, PMS conceptualization and design, and the nature of its use are all attributed to influence the learning-creating capability of PMS. Less structured organizations typically learn more generatively than bureaucracies due to higher intensity of informal communication resulting from people trying to make sense of the high-ambiguity environment (Kloot 1997, after Coopey 1995). Fried (2010) and Micheli & Manzoni (2010) and Vandenbosch & Higgins (1995) claim that the features and ultimate purpose of the system – control or learning – dictates the level of learning that is produced. When the PMS is designed for control, it can produce basic single-loop learning, but to achieve higher levels of learning, this purpose must be addressed in the fundamental conceptualization and enactment of the PMS (Fried 2010). Simple control mechanisms, such as comparing objectives and results and adapting resources, can produce single-loop learning in general, while generative learning is likely to be achieved when using several systems in combination (Batac & Carassus 2009). Also, the balanced selection of measures into the PMS, e.g. financial and non-financial or leading

and lagging indicators, can produce both levels of learning by creating feedback and feed-forward loops (Micheli & Manzoni 2010). These views imply that a single PMS can either be designed to support organizational learning or not, and multiple controls are needed to create different effects.

Another explanation is that the ability to promote learning is not fixed by the choices in PMS design phase, but rather that a single PMS can be used in different ways to achieve different types of learning. This approach gets support from Henri (2006b) and De Haas & Kleingeld (1999), who state that both single and double-loop learning can be generated through the use of PMS by combining diagnostic and interactive styles of use. Also Grafton et al. (2010) emphasize the different uses of a single PMS through feedback and feed-forward information, which are conceptually closely linked to single and double-loop learning respectively. Organizational double-loop learning is dependent upon both the use and characteristics of the PMS, such as freely available information, associated reward systems and participative decision-making (Kloot 1997). Regardless of whether the learning level produced is attributed to the organizational or PMS design features or styles of use, a shared the belief exists that when used effectively, PMS has the ability to support both levels of learning.

It is interesting that some researchers only refer to organizational learning with concepts and terminology usually associated with double-loop learning specifically. For instance, Atkinson (1998) describes the process of organization learning as the revision of beliefs about the relationships between the secondary and primary organizational objectives, and explains that organizational learning may occur when the data produced by PMS contradicts those beliefs. Also Jazayeri & Scapens (2008) in their case study only focus on PMS-generated strategic learning, which they refer to as acquiring a deeper understanding about how the various PMS perspectives, measures and their causal linkages fit together as a whole, leading to questioning and evolvement of the PMS and its elements. Finally, Neely & Al Najjar (2006) observed that performance measurement benefited their case organization by highlighting unexpected connections between different dimensions of performance, which provided the management with a learning opportunity through the validation and re-examination of their assumptions about business operations.

These examples probably highlight the differing opinions about what exactly constitutes learning – it could be that these studies consider learning to have occurred only when there is evidence of cognitive processing and changes in mental models, i.e. double-loop learning. It would be inappropriate to draw the conclusion from these studies that PMS could only produce double-loop and not single-loop learning. Rather, the studies imply that behavioral and adaptive single-loop learning is not considered to be organizational learning in its most valuable sense. Single-loop learning is generic, based on mechanistic monitoring and correction activity, and it is quite common in organizations. It is not

enough to produce a lasting competitive advantage, and some authors view it as mere adaptation as opposed to authentic learning. Thus, the studies do not necessarily claim that PMS is exclusively used for double-loop learning – they just ignore the single-loop effects as trivial, and focus the research attention on the double-loop effects with the ability of creating a sustainable competitive advantage. The possibility that PMS would be able to create double-loop learning effects but not single-loop is also abandoned by Argyris & Schön (1978), who state that diagnostic use of PMS and thus single-loop learning are a prerequisite for interactive use and double-loop learning. Therefore, double-loop learning can hardly exist independently from single-loop learning.

4.3 PMS balances organizational learning and control

A few studies also propose that the relationship between PMS and organizational learning cannot simply be labeled supportive, impeding or nonexistent, but is more complex. It has been suggested that the use of formal management control systems, including PMS, has the ability to limit excessive orientation to and moderate the performance outcomes of innovation (Bisbe & Otley 2004). The work of Simons (1987) finds that against the common perception it is the flexible prospector companies that use financial control systems more intensively than the conservative defender companies. Analyzing Simons' (1987) work, Dent (1990) suggests that this is because flexible prospector organizations are prone to innovative excess. They have the risk of overemphasizing flexibility and creativity, which may shift the focus away from productivity, while significant share of resources is being committed to innovation activities. This may result in a loss of strategic direction in a situation where the organization is unable to harness the innovation-enhancing impacts of interactive PMS use in form of more effective solutions. (Henri 2006b.) The freedom that flexible organizations give their managers in exploration and innovation may lead to excessive experimentation, and thus the diagnostic use of restrictive control systems is required to set boundaries, keep risk taking within sensible limits, and remind of maintaining effectiveness (Dent 1990; Henri 2006b). As Chenhall & Morris (1995) formulate, control systems need to be used to avoid "squandering resources on superfluous novelty". Also the external requirements set for flexible organizations by the environment in form of higher uncertainty call for intensified performance monitoring to boost organizational learning (Dent 1990).

On the other hand, too much focus on diagnostic PMS use can create stagnation and inability to develop and renew the organization (Henri 2006b). A balanced way of applying PMS is therefore needed to ensure that new ideas are effectively translated into profitable innovation and improved performance (Bisbe & Otley 2004), or more generally, to support both current and future capabilities (Grafton et al. 2010). In other words, PMS can help organizations balance flexibility and control so that the pursuits of innovative learning and productivity are optimized.

Organizations trying to capture the best elements of defender and prospector strategies may be able to utilize the administrative system with both control and coordination features to balance organizational stability and flexibility needs (Miles et al. 1978). Hence, formal control systems can co-exist with more organic and entrepreneurial practices, and actually help to utilize them effectively, which contradicts with the suggested incompatibility of formal control and creativity – formal control systems can benefit organizations, independent of what their strategic approach is (Chenhall & Morris 1995). The dual effects of PMS can be achieved by combining the different styles of PMS use (Henri 2006b). Henri (2006b) finds that the diagnostic and interactive styles of use complement and compete with each other. Quite obviously, the more interactive the style of PMS use is overall, the less diagnostic it tends to be. When they are applied in combination, their balanced use creates a dynamic tension ensuring the positive effects of interactive use can be achieved and expanded. Indeed, the ability to optimally balance interactive and diagnostic styles of PMS use constitutes an organizational capability as such. Flexible organizations operating in high environmental uncertainty are most likely to benefit from this dynamic tension that also boosts learning, as their survival is prominently based on their ability to foster creativity and learning throughout the organization. (Henri 2006b.)

4.4 PMS is irrelevant for organizational learning

The growing body of knowledge in the field of performance measurement systems and organizational learning recognizes that a relationship between PMS and learning exists. As pointed out before, the issue is still open to debate, and a consensus has not yet been formed. Still, most authors have a strong opinion either for or against – practically all studies admit that PMS and learning do have a significant relationship, but the argument is mostly about whether it is a positive or negative one. Therefore, it is difficult to find evidence or even opinions in the literature in favor of a non-existent relationship or correlation between the use of PMS and organizational learning.

A notable exception is offered in the work of Bisbe & Otley (2004), who studied the effect of interactive use of management control systems on innovation. According to many authors, the learning effects of PMS, or more generally MCS, may be harnessed especially through interactive use (Simons 1995a; Tuomela 2005; Henri 2006a). Moreover, innovation is conceptually close to learning, particularly generative learning, which focuses on creating new applicable knowledge by challenging the underlying unquestioned assumptions that guide the business operations. Bisbe & Otley (2004) found no evidence of MCS supporting innovation, nor any indirect effect on performance. They admit that there might be a positive impact of interactive use of MCS on innovation but only in low-innovating firms – innovation in those firms that already are innovative is likely be suppressed by MCS use. Instead, they found that the style of MCS use moderates the effect of innovation on performance. (Bisbe & Otley 2004.)

This finding receives some support from the aforementioned studies suggesting that the ways of combining diagnostic and interactive uses of PMS can affect how effectively innovations can be harnessed to the organization's benefit (e.g. Henri 2006b). Also Dougherty & Hardy (1996) mention that in their case study the emergence of innovations seemed to be one-off events, occurring rather despite than because of organizational systems, structures and processes.

The results of Bisbe & Otley (2004) and Dougherty & Hardy (1996) challenge the widespread consensus that PMS impacts organizational learning at least in some direction. They imply that PMS may not be an instrument that can spark learning in organizations as such. It might provide some assistance with its structured approach to organizations where the innovation effort is low, but for PMS to actually enhance learning also the high-innovating organizations should benefit from using it. In fact, it might be that the relationship between PMS and organizational learning is not mediating but a moderating one – PMS cannot create learning as the actual learning effects stem from elsewhere, while PMS and its use only moderate how these effects are translated into learning. This might shed more light on the wide acceptance regarding the PMS effects on learning, as most authors do not specify whether they mean a moderating or mediating relationship in saying that PMS has the ability to foster or support learning.

5 DISCUSSION

The field of PMS and organizational learning research is characterized by fragmentation, and disagreement prevails even regarding the most fundamental questions, such as if the influence of PMS use on organizational learning is a positive or negative one, or if describing their relationship requires a more complex conceptualization. Perhaps due to the ongoing debate and argument regarding the impact of PMS on learning, it appears that some of the fundamentals have been ignored. Clearly, some areas of crucial importance in organizational learning theory, such as the transition of individual learning onto organizational level, are largely ignored in the PMS literature or handled as commonly accepted truths. Building on the theories of organizational learning and performance measurement, a framework (Figure 8) was constructed to incorporate the key themes of the two seemingly separate topics. It was discovered that the two research streams share important linkages.

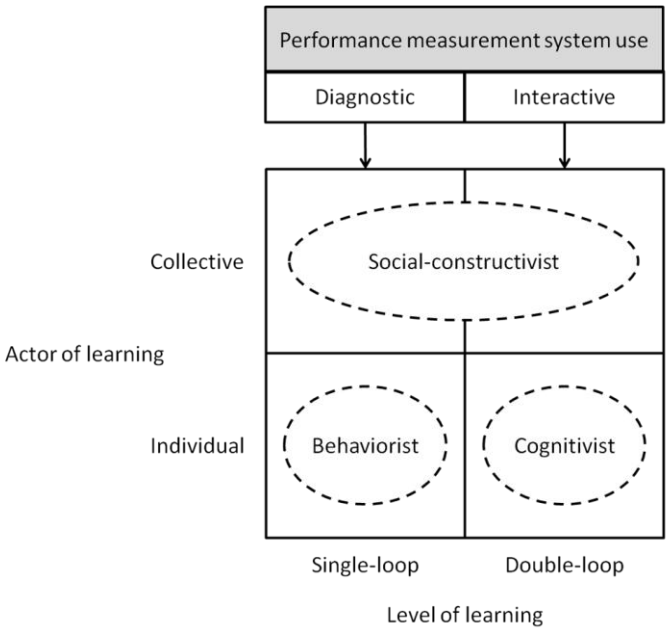

Figure 8. Framework for analyzing literature about the relations between PMS and organizational learning.

In this chapter, a systematic mapping of the relevant literature is carried out using the framework. The literature is analyzed with a focus on the core dimensions identified: the actor and level of learning as well as the style of PMS use. Finally, a conclusion is made and areas for future research proposed.

5.1 Mapping of the focus areas of the existing research

In chapter 4, the variety of different propositions concerning the relationship between PMS and organizational learning were mapped and discussed. Next, this study proceeds to examine how the current body of research fits the framework created earlier, and hence how well the current research covers the areas where the theories of PMS and organizational learning overlap. 35 articles explicitly considering the relationship between PMS and organizational learning specifically and providing some evidence on their linkages were identified (Table 4). Articles only referring to the relationship but not explicitly taking stance on the important dimensions were thus not considered.

The selection was made by first making a shortlist of articles where both PMS and organizational learning were discussed. Next, the remaining articles were scanned through to understand whether the authors only refer to this relationship "second-hand" by citing others, or actually report a study or analysis of the topic conducted by themselves. In addition, the paper needed to contain information on how PMS affects learning or vice versa, not just mention the two topics without linking them. Finally, only those studies with first-hand research experience, regardless of their methodology, were included. After a thorough analysis of the PMS and organizational learning literatures from a theoretical perspective, these 35 articles formed the basis for mapping PMS and organizational learning linkages using the framework developed (Figure 8).

Table 4. Key articles in analysis of the relationships between performance measurement systems and organizational learning.

Author	Year	Publishing journal
Ahn	2001	Long Range Planning
Argyris	1982	Accounting, Organizations and Society
Batac & Carassus	2009	Management Accounting Research
Bisbe & Otley	2004	Accounting, Organizations and Society
Buckmaster	1999	International Journal of Public Sector Management
Chenhall	2005	Accounting, Organizations and Society
Chenhall & Morris	1995	Omega International Journal of Management Science
Dossi & Patelli	2010	Long Range Planning
Ferreira & Otley	2009	Management Accounting Research
Feurer & Chaharbaghi	1995	Quality Management & Technology
Franco-Santos et al.	2007	International Journal of Operations and Production Management
Fried	2010	Critical Perspectives on Accounting
Godener & Söderquist	2004	R&D Management
Grafton et al.	2010	Accounting, Organizations and Society
De Haas & Kleingeld	1999	Management Accounting Research
Hall	2011	Management Accounting Research
Henri	2006	Accounting, Organizations and Society
Kaplan & Norton	1996	Strategy and Leadership
Kasperskaya & Tayles	2013	Managerial Auditing Journal
Kloot	1997	Management Accounting Research
Mausolff	2004	Public Performance & Management Review
Micheli & Manzoni	2010	Long Range Planning
Miles et al.	1978	Academy of Management Review
Miller	1993	Academy of Management Review
Neely & Al Najjar	2006	California Management Review
Oliver	2009	International Journal of Quality & Reliability Management
Pinheiro de Lima et al.	2012	International Journal of Production Economics
Rompho & Siengthai	2012	Journal of Intellectual Capital
Simons	1995	Harvard Business Review
Srimai et al.	2011	Measuring Business Excellence
Tuomela	2005	Management Accounting Research
Vaivio	2004	European Accounting Review
Vandenbosch & Higgins	1995	Journal of Management Information Systems
De Vilbiss	2006	Leadership & Management in Engineering
Widener	2007	Accounting, Organizations and Society

Articles included in the analysis represent not only different views of the relationship between PMS and organizational learning but also different methodologies, focus areas and learning theories. They span a long time range from 1982 to 2013, which also gives an opportunity to examine how the understanding of the issue has developed over time. As suggested in the previous chapter, it appears that the opinion about the negative effects of PMS on learning has softened over time due to a broader PMS conceptualization including comprehensiveness and interactive enabling elements. The articles are now analyzed according to each dimension of the framework.

5.1.1 Actor of learning

Organizational learning is embodied in activities or processes that can occur on many levels of analysis – individual, group, or organizational level (Oliver 2009). When it comes to studies addressing organizational learning, they usually only consider one lev-

el of actor – individual, usually managerial or executive level, or collective organizational level (Vandenbosch & Higgins 1995) – or at least refer to the other level very vaguely. The same applies to the studies analyzed here. They seldom make explicit whether their focus is on individual or collective level, but in many cases this distinction can be deducted from the research approach and the conceptualizations. For example, when the rhetoric of the study uses concepts like mental model confirming and building (e.g. Hall 2011), its focus is prominently on the cognitive structures of individuals, though such structures might be distributed to the organization through communication.

Quite surprisingly, few studies link the individual and collective levels of organizational learning together despite the nature of organizational learning essentially requiring both levels and their interaction – without effective information collecting and storage mechanisms, learning remains localized with the individuals (Oliver 2009). In fact, only those studies (e.g. Feurer & Chaharbaghi 1995b; Kloot 1997; Mausolff 2004; Chenhall 2005; Batac & Carassus 2009; Oliver 2009) emphasizing the very transmission process of learning throughout the organization, often building upon the works of Huber (1991) and Crossan et al. (1999), properly address this dimension. Individual learning is essential, but it must be shared with other organizational members in order to create organizational learning (Batac & Carassus 2009). It should also be recognized that as individuals interpret their experiences and translate them for organizational use, these interpretations may be highly subjective depending on their personal goals, which may bias the organizational knowledge base according to the most influential groups (Feurer & Chaharbaghi 1995b). Thus, more organizational discussion and iteration of the information generated by individuals should make learning more robust. Studying organizational learning by strictly focusing on individual or organizational level only may have the risk of oversimplifying the complex nature of organizational learning and hence failing to truly understand its processes.

Organizational learning is only achievable through individuals, but understanding managerial learning alone does not yet allow full understanding of collective organizational learning (Argyris & Schön 1978; Fiol & Lyles 1985; Huber 1991). Many studies (e.g. Vandenbosch & Higgins 1995; Kaplan & Norton 1996b; Neely & Al Najjar 2006; Hall 2011) focusing solely on individual learning in an organizational context fail to build a bridge onto the organizational level, and simply seem to assume that the learning achieved by individuals is effortlessly transferred to organizational level. For instance, Kaplan & Norton (1996b) emphasize executive and managerial learning, but Chenhall (2005) rather sees that organizations should facilitate the learning of all organizational members with appropriate structures and strategies, taking one step closer to truly collective learning. However, often it is exactly these interfaces and the transfer of learning between them that represent the biggest risk of failure in organizational learning, as it is the interface where knowledge must be transformed in order to proceed in the learning process (see e.g. Kim 1993; Feurer & Chaharbaghi 1995b). Thus, oversimplifying as-

sumptions should be avoided when individual learning is used as a proxy for organizational learning, and more effort should be put in elaborating these transmission processes to understand how PMS could best support learning. This can be not only by feeding the learning of individuals, but also by supporting the processes of learning transfer, and by cutting down the cognitive and structural fences restricting the flow of information from individuals to the collective (see e.g. Kim 1993; Chenhall 2005).

On the other hand, when the focus of the study is on the organizational level (e.g. De Haas & Kleingeld 1999; Henri 2006; Ferreira & Otley 2009), the researchers tend to focus more on the communication, collective debate and questioning, and social processing and refining of information. As the key element in transferring learning from individuals to the collective is dialogue and the constant debate provoked by the PMS (Chiva & Alegre 2005; Mazutis & Slawinski 2008), this approach appears to be less prone to simplification. Yet, it does not take into account the processes by which the organization acquires information through individuals. As Batac & Carassus (2009) point out, in a hierarchical organization the distribution of knowledge is by no means automatic. Focusing only on organizational level may, to some extent, ignore the mechanisms of PMS that initially trigger the learning experience among individuals. As a consequence, the importance of designing the PMS to most effectively support its users' learning requirements, suit their attributes and cognitive styles may be overlooked. (Argyris 1982.) For instance, individuals with different values may perceive the performance measures differently, and these conflicting opinions could be taken advantage of in form of richer debate and identification of conflicting areas (Feurer & Chaharbaghi 1995b).

Majority of the studies analyzed for this study, 20 out of 35, focus primarily on collective level learning. However, this is seldom expressed explicitly. For example, Bisbe & Otley (2004) study innovation as an organizational level phenomenon, aiming to contribute to the lack of literature linking MCS and innovation and "address this relationship at the organizational level". Meanwhile, Henri (2006b) takes a resource-based view to organizational learning, seeing it as an organizational capability rather than something individuals do. In contrast, Vandenbosch & Higgins (1995) explicitly state that their research focuses on individual learning at the executive level. By making their underlying assumptions and research scope more explicit and clearly defining the unit of analysis, the authors could contribute to more systematic exploration of the field, thereby paving the road for conceptually more structured future research.

5.1.2 Level and underlying theory of learning

The level of learning refers to single and double-loop learning, or similar concepts such as adaptive and generative learning, or mental model confirming and building. This typology is well-established in the literature, and widely used also in studies combining PMS and organizational learning. The depth of learning achievable with PMS is particu-

larly interesting; the ability of PMS to produce single-loop learning due to its inherent nature of monitoring and controlling performance deviations is generally accepted, and researchers have for long time been intrigued by the question whether PMS could similarly benefit double-loop learning. As discussed before, the consensus is increasingly for a positive answer, as the conceptualization of PMS has grown broader and managers have learnt to apply PMS in different ways and for different purposes over time (Bisbe & Otley 2004).

The idea of two distinct levels of learning is applied in most of the studies analyzed here. Indeed, 17 out of 35 studies directly refer to single and double-loop learning (e.g. Henri 2006b; Widener 2007; Ferreira & Otley 2009; Micheli & Manzoni 2010), adaptive and generative learning (e.g. Kloot 1997; De Vilbiss 2006) or mental model confirming and building (Vandenbosch & Higgins 1995; Hall 2011). In addition, 5 academic papers imply the different forms of development. For instance, Miles et al. (1978) introduce the strategic types of organizations. In his typology, the innovative prospector strategy, and the defender strategy focused on incremental efficiency improvement, ultimately stem from the emphases on different learning levels. Another example is provided by Mausolff (2004), who in his case study describes how organizational members often fixed a problem with small adjustments within their "existing theory of action", while sometimes the problem required them to develop a "solution involving a new theory of action".

However, there are differing opinions about the level of learning PMS can create. Some say PMS is only able to create single-loop learning, or at least that double-loop learning is highly unlikely and achievable only under specific conditions (Argyris 1982; Oliver 2009; Hall 2011). Meanwhile, others claim that PMS can also trigger double-loop learning (e.g. Kaplan & Norton 1996; Kloot 1997; De Haas & Kleingeld 1999). There are also a number of papers that study organizational learning in general without mentioning the two levels (e.g. Bisbe & Otley 2004; Chenhall 2005; Pinheiro de Lima et al. 2012), but they seem to primarily consider the generative type of learning involving innovation and creating new knowledge. This is understandable as single-loop learning is common (Argyris & Schön 1978) for any organization monitoring its performance, and hence it is unlikely to provide any competitive advantage. The ability to double-loop learn, on the other hand, is more difficult to achieve or imitate, and thus can constitute a valuable organizational capability with competitive significance (Senge 1990; Nonaka 1991), making it a more relevant research subject from the organizations' point of view. Though many writers do perceive organizational learning as a competitive advantage, Chenhall (2005) found some evidence that for organizations with low-cost strategies on-going organizational learning is not necessary, but they could rely on established way of doing business. This sounds rather controversial, because when broader paradigmatic changes take place in the industry, organizations with considerable inertia may not be able to adapt to the changes at the pace required by the market. Lack of

generative learning may not affect organizational performance in short run, and it can even enhance it by allowing focusing resources on efficiency improvement rather than innovation activities. However, in longer timescale organizations must be able to learn to overcome the bigger technological and other chasms.

One observation is that when the study discusses mental model confirming and building, its focus is usually on the individual level (e.g. Vandenbosch & Higgins 1995; Hall 2011). Individuals obtain pieces of information and use them to confirm their mental models if they fit together, or to build them further if the information acquired brings something additional to the individual's mental model or forces them to modify it in order to accommodate the new information (Vandenbosch & Higgins 1995). Single and double-loop learning concepts appear to be used more universally, both when referring to individual and organizational levels. This is implied in the articles, as analyzing the PMS information may cause individual managers to re-examine their assumptions about business operations (Neely & Al Najjar 2006) as well as open organizational level dialogue to enhance learning and act as a catalyst for ongoing debate and challenging regarding the data and assumptions (Simons 1995a).

Usually the PMS-related studies focus on either of the core learning dimensions: single and double-loop learning dimension, or the diffusion of learning throughout the organization – in other words, the individual-collective learning interface. An exception is made by Batac & Carassus (2009, see also Kloot 1997), who build a research framework based on both the learning transfer process and the two levels in an integrative approach. Their study underlines the importance of linking the two perspectives together, as they propose that in order to be able to proceed from adaptive to generative learning, a collective effort and interactive dialogue is required (Batac & Carassus 2009). In other words, moving through the organizational learning cycle stages and expanding learning from individual to the collective is a precondition for double-loop learning. This implies that to be able to achieve double-loop learning with PMS, an interactive way of using it involving extensive discussion and debate is required (Buckmaster 1999; Tuomela 2005; Rompho & Siengthai 2012), and that generative learning is hardly achievable on individual level. Also Miller (1993) and Argyris (1982) are doubtful about an individual's ability to double-loop learn because of the human tendency to rationalize away observations inconsistent with their prevalent understanding. Miller (1993) also points out the importance of dialogue – discussing, comparing and challenging each other's assumptions collectively. Thus, it is surprising that so few studies discussing single and double-loop learning pay any attention to the learning transfer between individuals and collective level, and focus only on either one of them instead.

Combining the actor that the studies focus on and the organizational learning level addressed may also provide some insight on the learning theories underlying the research. Feurer & Chaharbaghi (1995b) term the two types of learning as behavioral and cogni-

tive, implying that single-loop learning is more automated and does not necessarily involve association building, but is a mechanistic response to a stimulus. Also Batac & Carassus (2009) describe single-loop learning as "adaptive changes in behavior" and double-loop learning as a "cognitive learning process which challenges understanding of the causes of the problem". Even though other papers do not express their underlying learning theories as explicitly, indications of them can be found. Some formulations imply a behaviorist learning orientation – the mechanistic confirming of mental models requires no changes in cognitive structures but simply repeating the existing behavior (Hall 2011); learning involves testing and improving behavioral routines (Buckmaster 1999); learning is like an automation of a skill so that performing it does not have to be a conscious effort (Argyris 1982); and the occurrence of organizational learning is largely related to a permanent change in behavior (Buckmaster 1999, after Senge 1990 and Argyris & Schön 1978). Other studies give an impression of a more cognitive learning approach, suggesting that building up mental models requires changing and creating cognitive models and accommodating new information into them (Hall 2011); that learning occurs through knowledge acquisition (Huber 1991) and builds on organizational memory (Buckmaster 1999); and that learning through experience shapes managers' cognitive structures through which they perceive the world (Miller 1993). Often, behavioral and cognitive elements are mixed, as they are both seen as necessary for learning. For example, one definition calls it a process of improving actions through improved knowledge and understanding (Oliver 2009, after Fiol & Lyles 1985 and Huber 1991), which is a rather practical approach due to the fact that a sound learning system requires both single and double-loop learning (Huber 1991; Oliver 2009).

As observed in the previous chapter, the majority of articles keep their focus on the organizational level instead of individual, or even state that only focusing on individual level is not adequate (Kloot 1997). Behavioral and cognitive learning theories focus fundamentally on individual learning, while social and constructivist theories study collective learning (Chiva & Alegre 2005). Therefore, it is not surprising that there are many referrals to elements of social-constructivist learning theories, like sharing and collectively interpreting information (Kloot 1997; Mausolff 2004); building procedural knowledge and cognitive strategies, as well as enabling the analysis and sharing of individuals' experiences throughout the organization (Oliver 2009); deriving learning from a process of experiencing, reflection, hypothesis building and testing (Buckmaster 1999); and enacting meaning from new ambiguous events and developing a shared understanding of business through reinterpreting and negotiating assumptions (Fried 2010). Though the underlying learning theory in the articles is often difficult to deduct, the framework drafted earlier in this study receives some support from the literature. On individual level, single-loop and behavioral learning as well as double-loop and cognitive learning are related, while organizational level learning always requires interaction and collectively developing shared mental representations, implying a social-constructivist theory.

5.1.3 Style of PMS use

When an organization wishes to use its PMS for prompting double-loop learning, it should adjust the PMS to facilitate and amplify the dialogue among organizational members to enhance the transfer of accumulated knowledge between individuals and the collective (Kloot 1997; Chenhall 2005; Dossi & Patelli 2010). Many authors claim that this can be achieved when the PMS is used interactively (e.g. Simons 1995a; Kloot 1997; Henri 2006b; Dossi & Patelli 2010; Hall 2011). Traditionally, performance measurement systems have been developed to serve the need for a diagnostic control tool (Argyris 1982; Batac & Carassus 2009), but the atmosphere is changing – the more contemporary views of PMS recognize it can be designed either for diagnosis or interactive learning. However, also the idea that a PMS is by design either diagnostic or interactive as suggested by Kloot (1997), and can only be used accordingly, seems old-fashioned. How the PMS is used in practice is even more important than how it is designed (Ferreira & Otley 2009). For example, Hall (2011) emphasizes the importance of the style of use, not the design, as even a modern comprehensive PMS can be used in formal ways and impede learning. A state-of-the-art PMS is flexible (Kloot 1997; Oliver 2009); it can be used in different ways to fulfill multiple needs ranging from control to learning and from boundary-setting to enabling (Simons 1995a; Fried 2010); and it is never carved in stone but evolves in concert with the organization to match the changing requirements set by the competitive environment and the pursued strategy (Feurer & Chaharbaghi 1995b; Kloot 1997; De Vilbiss 2006). The interactive use of PMS embodies ongoing dialogue and debate, which is the essential precondition for the diffusion and development of learning throughout the organization (Henri 2006b; Batac & Carassus 2009; Ferreira & Otley 2009). It may provide ideas where to look for new opportunities and create an atmosphere where new ideas are embraced instead of turning them down (Bisbe & Otley 2004). If the PMS is to foster learning, it must enhance these interactions and create communication situations where open discussion can take place. It should provide multiple views into the actions and events behind the data, so that the organizational members can triangulate problems and validate, whether the problems arise from performance deviations or from more fundamental changes in the business environment.

The majority of studies analyzed represent the contemporary understanding of PMS. They recognize its potential in providing a means for interactive and enabling control instead of strictly focusing on mechanistic management, tight control and monitoring (e.g. Kloot 1997; Tuomela 2005; Henri 2006b; Batac & Carassus 2009). According to Simons (1995a), an interactive PMS is one that focuses on constantly changing strategic information requiring frequent attention on all managerial levels, and constitutes a catalyst for ongoing face-to-face debate and questioning of the underlying data and assumptions among managers, subordinates and peers. 21 out of the 35 articles analyzed discuss the diagnostic and interactive uses of PMS. In addition, 9 articles not directly fo-

cusing on the style of use imply that their view of PMS is not confined to the traditional diagnostic tool of control. For example, Kloot (1997) takes a broad view on management control systems, claiming they should not only ensure that certain procedures are followed, but to be effective they must also allow the freedom to approach problems more creatively. De Vilbiss (2006) writes that PMS creates an opportunity to learn by creating discussion, enabling organizational members to step out of and critically examine their paradigms. Kaplan & Norton (1996b) emphasize the managers' regular and systematic attention to the implied linkages in their strategy, as well as learning being the ultimate purpose of measuring performance. PMS comprehensiveness (e.g. Kaplan & Norton 1996b; De Vilbiss 2006; Grafton et al. 2010; Dossi & Patelli 2010; Rompho & Siengthai 2012) is also a common feature implying a more interactive approach to performance measurement: De Haas & Kleingeld (1999) suggest that interactive control requires the design and application of multiple diagnostic controls and Dossi & Patelli (2010) have found strong associations between measurement diversity (primarily the inclusion of non-financial indicators) and interactive use of PMS. In short, the focus of PMS is moving from control to enabling (Fried 2010). All these are characteristics of an interactive PMS.

Only four articles saw that the PMS is strictly a monitoring and control device by nature, and thus could not spark learning at least on double-loop level. For example, Ahn (2001) claims that the popular BSC can only be used as a diagnostic system and did not find evidence that it could bring about double-loop learning, as implied by the statement that the case company "does not have sufficient reliable experience to judge whether the BSC tool can be really used for checking their original premises". Argyris (1982) describes both organizations and management information systems in general as being designed for single-loop learning, error detection and correction, which makes double-loop learning extremely unlikely. Also Miller (1993) argues that information systems reinforce the uniformity of perceptions, conceal external change, and are rarely used to explore opportunities regarding new products, markets or technologies. Clearly, these articles take a narrow view of PMS without using much imagination regarding how they could be used more interactively to complement mechanistic surveillance. It is likely that they only focus on the diagnostic uses of PMS and ignore the implications of interactive use (Bisbe & Otley 2004). Hence, it seems clear that the consensus in the field is increasingly for the possibility of more creative ways of using PMS (Batac & Carassus 2009).

The diagnostic and interactive PMS uses are directly linked to single and double-loop learning respectively by a number of authors (e.g. Tuomela 2005; Widener 2007; Batac & Carassus 2009; Ferreira & Otley 2009). Single and double-loop learning need each other and feed each other (Huber 1991). Similarly, diagnostic and interactive uses can act in cooperation and complement each other, not just be substitutes (Widener 2007). A recent line of research (Henri 2006b; Widener 2007; see also Chenhall & Morris 1995)

has identified that the dynamic tension resulting from a balanced use of the two simultaneously competing but complementary styles can have an impact on organizational learning and constitute an organizational capability as such (Henri 2006b). This occurs through the supporting structure that the formal diagnostic system provides for the interactive system to be effective, while enhancing the organic decision-making processes associated with interactive use (Chenhall & Morris1995; Widener 2007). In other words, the dynamic tension ensures the achievement of the positive effects of interactive PMS use by expanding them, and its impact depends tightly on the organizational culture and environmental uncertainty (Henri 2006b). Thus, only by combining both diagnostic and interactive uses of PMS can the full potential of the system be realized (Widener 2007). This implies that in order to get the maximum learning benefits from the PMS organizations should not focus on the interactive use exclusively, but diagnostic use is still very relevant and not to be forgotten. The resulting dynamic tension has the potential to support dialogue, flexibility, creativity and attention-focusing, as well as to promote mutual understanding: the diagnostic system communicates the strategy emerging through the interactive system (Henri 2006b; Widener 2007). Furthermore, the balanced use of PMS both diagnostically and interactively may protect the organization from innovation excess on one hand and from stagnation on the other hand (Chenhall & Morris 1995; Henri 2006b).

Finally, as the interactive PMS use as a trigger for organizational learning is so well-established in the literature, four interestingly contradicting notions are pointed out. Grafton et al. (2010) associate organizational learning with diagnostic feedback control instead of more interactive feed-forward control, even though they connect feedback control with attributes similar to single-loop learning, describing it as corrective action "within the domain of existing activity". Furthermore, Henri (2006b), though generally promoting the ability of interactive PMS use in fostering the capability of learning, admits that in some circumstances the diagnostic PMS use might positively influence organizational performance while interactive use would have a negative impact. Bisbe & Otley (2004) agree, as they found that interactive use positively affects innovation only in low-innovating firms – in high-innovating firms the effect was found to be negative. Widener (2007) posits even more radically that she only found a positive relationship between diagnostic use of PMS and organizational learning – the interactive use of PMS, contrary to the common understanding, was not associated with organizational learning. These contradicting views may provide evidence that the relationship of PMS and organizational learning is complex, and cannot be described simply as a direct positive or negative effect.

5.2 Conclusion and areas for future research

Pulling together the abundance of literature for a conclusion requires taking stance on questions yet unresolved even by the research community. Yet, based on the observa-

tions made in this study, it can be confirmed that organizational learning is a complex phenomenon – it cannot be broken into pieces, which are then one by one studied in the PMS context, if a truthful picture of the constructs and their interactions is to be formed. However, this is exactly the approach that many studies so far have taken. Organizational learning can be described across two dimensions: the depth of learning and the process of transferring learning from individuals to organizations through dialogue and iteration. Both dimensions should be considered simultaneously, as individual double-loop learning appears to be rather unlikely – people in general have the inbuilt tendency to be blind to their own cognitive limitations and to stick with the mental models they are accustomed to. Being able to critically review and challenge one's own thought processes and detect errors in them is, if not impossible, at least difficult and painful. Therefore, it can be argued that effective double-loop learning can most effectively be achieved collectively: interaction allows exposing individual mental models, finding incompatibilities between them, detecting and correcting errors in them, and refining them collaboratively towards a more accurate representation of reality.

The research shows that PMS can assist the organizational learning process tremendously, as it provides support for both the level and actor dimensions. A diagnostically used PMS supports single-loop learning by communicating targets through metrics and by providing a comprehensive tracking system for achieving them. It also promotes higher strategic understanding by showing how individual work efforts contribute to the overall strategy. It enhances the organizational culture with a feel of a mutual effort towards a common goal, and this way PMS also plays a role in creating a learning environment – a prerequisite for learning to occur. PMS supports double-loop learning when used interactively, as it enforces dialogue and thereby makes assumptions explicit and open to review. Thus, PMS benefits both levels of learning. In addition, PMS strongly contributes to the learning transfer process on each level of the organizational learning cycle: it produces information that can be used to trigger error detection and learning; when used interactively, it provides means of framing information and a forum for dialogue through which interpretation takes place; it is useful when communicating the objectives throughout the organization and integrating the new knowledge to all levels of it; and it can be used to store information and institutionalize values expressed in the objectives (Chenhall 2005). In summary, the effectiveness of PMS in enhancing organizational learning lies in the fact that it can support all the key dimensions of organizational learning identified in the framework when diagnostic and interactive styles are combined. Implementing a PMS does not guarantee learning, but when applied correctly, it may constitute the single most comprehensive trigger and support system for it.

The following summary (Table 5) was conducted by drawing together the findings from analyzing relevant literature with the framework developed. It lists all the articles analyzed and how they respond to the key dimensions of the relationship between PMS and organizational learning – actor, level of learning and the understanding of PMS and its

definition underlying the study. The actor column indicates whether the article discusses learning on individual (IL) or organizational (OL) level. The level of learning refers to what type of learning, single (SLL) or double-loop (DLL), the article focuses on. The use of PMS indicates whether the author recognizes the possibility to use PMS interactively, or only sees it as a purely diagnostic tool. Parentheses are used when the dimension is ambiguous or indirectly expressed, and the field is left empty when drawing conclusions on a reasonably reliable level was not possible.

Table 5. Summary of articles analyzed on key dimensions.

Author	Year	Actor	Learning level	PMS use
Ahn	2001	OL	(SLL)	Diagnostic
Argyris	1982	IL + OL	SLL	(Diagnostic)
Batac & Carassus	2009	IL + OL	SLL + DLL	Interactive
Bisbe & Otley	2004	OL	-	Interactive
Buckmaster	1999	OL	SLL + DLL	(Interactive)
Chenhall	2005	IL + OL	-	(Interactive)
Chenhall & Morris	1995	OL	-	Interactive
Dossi & Patelli	2010	OL	-	Interactive
Ferreira & Otley	2009	OL	SLL + DLL	Interactive
Feurer & Chaharbaghi	1995	IL + OL	SLL + DLL	(Interactive)
Franco-Santos et al.	2007	OL	(SLL)	(Diagnostic)
Fried	2010	OL	SLL + DLL	Interactive
Godener & Söderquist	2004	OL	(SLL + DLL)	(Interactive)
Grafton et al.	2010	OL	(SLL + DLL)	Interactive
De Haas & Kleingeld	1999	OL	SLL + DLL	Interactive
Hall	2011	IL	SLL + DLL	Interactive
Henri	2006	IL + OL	SLL + DLL	Interactive
Kaplan & Norton	1996	IL	SLL + DLL	(Interactive)
Kasperskaya & Tayles	2013	OL	-	Interactive
Kloot	1997	IL + OL	SLL + DLL	Interactive
Mausolff	2004	IL + OL	(SLL + DLL)	(Interactive)
Micheli & Manzoni	2010	OL	SLL + DLL	Interactive
Miles et al.	1978	OL	(SLL + DLL)	(Interactive)
Miller	1993	IL	SLL	(Diagnostic)
Neely & Al Najjar	2006	IL	DLL	-
Oliver	2009	IL + OL	SLL	(Interactive)
Pinheiro de Lima et al.	2012	OL	(SLL + DLL)	Interactive
Rompho & Siengthai	2012	IL + OL	SLL + DLL	Interactive
Simons	1995	OL	-	Interactive
Srimai et al.	2011	OL	SLL + DLL	Interactive
Tuomela	2005	OL	SLL + DLL	Interactive
Vaivio	2004	IL + OL	SLL + DLL	Interactive
Vandenbosch & Higgins	1995	IL	SLL + DLL	-
De Vilbiss	2006	OL	DLL	(Interactive)
Widener	2007	OL	SLL + DLL	Interactive

The summary clearly shows how the core topics repeat themselves in the research of PMS and organizational learning. There is a broad consensus that organizational learning is not a single construct, but involves two distinct levels that differ greatly in terms of the frequency they are present in organizations and the learning and self-reflection capability they require. These two levels, single and double-loop learning, are generally well addressed in the papers. On the other hand, the actor in the focus of the analysis is rarely expressed in explicit terms. Studies also tend to either focus exclusively on individual learning leaving the organizational interest unsatisfied, or only discuss organiza-

tional level learning as if the transfer of knowledge from individuals to the organization would be an automatic and unproblematic process. Individual and organizational perspectives are seldom combined, even though organizational learning as a phenomenon is dependent on both levels and their interaction, and thus it would be crucial to specify how PMS can assist in this transition process.

Another gap in the research is the lack of studies recognizing both the level of learning and the individual-collective learning transfer process when studying relations of PMS and organizational learning. It may have been a conscious choice to limit the analysis to only one construct or dimension of learning at a time for the sake of simplicity, but in the future a more comprehensive and integrated view would be valuable, to paint a full picture of how the dimensions of organizational learning interact with each other and the PMS. It would be useful to study these interactions further, as for example Batac & Carassus (2009) claim that double-loop learning requires a collective effort – raising the question whether individuals are capable of double-loop learning at all, due to the mental limitations of detecting flaws in their own thinking (Argyris 1982). Including both the level and the actor of learning in the same study would integrate and increase understanding of the complex process of organizational learning in the context of performance measurement. In this regard, for example the work of Batac & Carassus (2009) could provide a good starting point for future research.

Finally, also the notion of diagnostic and interactive uses of PMS is a widely-adopted analysis approach when it comes to studying organizational learning. Generally, it is believed that the diagnostic use of PMS does not contribute to organizational learning or if it does, it does so only on single-loop level, whereas the interactive use is seen as the prominent source of organizational learning. Interestingly, a couple of more recent studies (e.g. Henri 2006b; Widener 2007) make an attempt to break this consensus. As Widener (2007) contemplates in her study, studies focusing only on interactive controls and organizational learning may get evidence of a supportive relationship, if the other control systems are not controlled for, as she found the interactive systems to affect learning through the other systems. Even Simons (2000, cited by Widener 2007), the creator of the levers of control framework himself, understood that the levers should not be used in isolation, but they rather interact and complement each other. Hence, the idea of dynamic tension between diagnostic and interactive uses fostering learning definitely deserves more attention.

The conceptual confusion and diversity regarding the definitions of organizational learning and performance measurement systems is another area where further theoretical development would still be needed. This is a problem quite characteristic to this field of research, as pointed out by several authors (e.g. Easterby-Smith 1997; Chiva & Alegre 2005; Franco-Santos et al. 2007). Research on PMS has been approached from multiple disciplines, contributing to the large variety of definitions and characteristics of

PMS (Franco-Santos et al. 2007). For instance, the degree to which PMS is seen to be able to have an enabling role in addition to the diagnostic one varies greatly among studies (Bisbe & Otley 2004). Similarly, a number of disciplinary perspectives and learning theories have been used to define organizational learning (Easterby-Smith 1997), and as a result disagreement of even the definition of organizational learning itself persist (Chiva & Alegre 2005). The field of organizational learning overall is vast, and as the interest in learning organizations and intellectual capital is relatively new, there is still plenty to explore (Batac & Carassus 2009). This diversity creates confusion and limits the extent to which different studies can be compared and their results generalized (Franco-Santos et al. 2007). By working towards more systematic definitions and conceptualizations, the consistency of the field could be improved, which would provide a more solid foundation for the future research to build upon.

Finally, the framework presented in this study is a rough theoretical development and is only meant to provide some structure to the understanding of how PMS and organizational learning affect each other. It is an approximate and generalized mapping rather providing guidelines than strictly classifying the phenomenon. This is also illustrated by the outlier studies breaking the consensus about, for instance, interactive use of PMS creating double-loop learning. To validate and refine the theoretical framework, it would be very interesting to test it empirically in the future. To end with, the proposed directions for future research areas are summarized below.

- Research on how the use of PMS could more effectively contribute to the learning transfer between individuals and the organizational level
- Research integrating the two most important organizational learning dimensions – the actor and level of learning – together in the PMS context
- Further research on how the dynamic tension between diagnostic and interactive PMS uses affects organizational learning when they are examined in combination
- Further development towards a consensus regarding the concepts and definitions across the research field
- Research on how the framework presented in this study matches the reality in an empirical setting

REFERENCES

Ahn, H. 2001. Applying the balanced scorecard concept: an experience report. Long Range Planning 34, 4, pp. 441-461.

Amabile, T.M. 1998. How to kill creativity. Harvard Business Review Sep-Oct, pp. 77-87.

Argyris, C. 1983. Action science and intervention. Journal of Applied Behavioral Science 19, 2, pp. 115-140.

Argyris, C. 1982. Organisational learning and management information systems. Accounting, Organizations and Society 2, 2, pp. 113-123.

Argyris, C. & Schön, D. 1978. Organizational learning: a theory of action perspective. Addison-Wesley, Reading, MA. 344 p.

Atkinson, A. 1998. Strategic performance measurement and incentive compensation. European Management Journal 16, 5, pp. 552-561.

Azofra, V., Prieto, B. & Santidrián, A. 2003. The usefulness of a performance measurement system in the daily life of an organization: a note on a case study. The British Accounting Review 35, 4, pp. 367-384.

Bain & Company 2011. Insights: management tools – balanced scorecard [WWW]. [Referred 28.11.2013]. Available at: http://www.bain.com/publications/ articles/ management-tools-balanced-scorecard.aspx

Bandura, A. 1997. Self-efficacy: the exercise of control. W.H. Freeman and Company, New York. 604 p.

Batac, J. & Carassus, D. 2009. Interactions between control and organizational learning in the case of a municipality: a comparative study with Kloot (1997). Management Accounting Research 20, 2, pp. 102-120.

Bhimani, A. & Langfield-Smith, K. 2007. Structure, formality and the importance of financial and non-financial information in strategy development and implementation. Management Accounting Research 18, 1, pp. 3-31.

Bisbe, J. & Otley, D. 2004. The effects of the interactive use of management control systems on product innovation. Accounting Organizations and Society 29, 8, pp. 709- 737.

Bititci, U.S., Mendibil, K., Nudurupati, S., Garengo, P. & Turner, T. 2006. Dynamics of performance measurement and organizational culture. International Journal of Operations & Production Management 26, 11-12, pp. 1325-1350.

Blackler, F. 1993. Knowledge and the theory of organizations – organizations as activity systems and the reframing of management. Journal of Management Studies 30, 6, pp. 863-884.

Bourne, M.C.S., Kennerley, M. & Franco-Santos, M. 2005. Managing through measures : a study of impact on performance. Journal of Manufacturing Technology Management 16, 4, pp. 373-395.

Bourne, M., Mills, J., Wilcox, M., Neely, A. & Platts, K. 2000. Designing, implementing and updating performance measurement systems. International Journal of Operations & Production Management 20, 7, pp. 754-771.

Braam, G.J.M. & Nijssen, E.J. 2004. Performance effects of using the balanced scorecard: a note on the Dutch experience. Long Range Planning 37, 4, pp. 335-349.

Buckmaster, N. 1999. Associations between outcome measurement, accountability and learning for non-profit organizations. International Journal of Public Sector Management 12, 2, pp. 186-197.

Burchell, S., Clubb, C., Hopwood, A. & Hughes, J. 1980. The roles of accounting in organizations and society. Accounting, Organizations and Society 5, 1, pp. 5-27.

Burney, L.L., Henle, C.A. & Widener, S.K. 2009. A path model examining the relations among strategic performance measurement system characteristics, organizational justice and extra- and in-role performance. Accounting, Organizations and Society 34, 3, pp. 305-321.

Burns, T. & Stalker, G.M. 1961. The management of innovation. Tavistock Publications, London. 269 p.

Butler, A., Letza, S.R. & Neale, B. 1997. Linking the balanced scorecard to strategy. Long Range Planning 30, 2, pp. 242- 253.

Carley, K. 1992. Organizational learning and personnel turnover. Organization Science 3, 1, pp. 20-46.

Cheng, M.M., Luckett, P.F. & Mahama, H. 2007. Effect of perceived conflict among multiple performance goals and goal difficulty on task performance. Accounting and Finance 47, 2, pp. 221-242.

Chenhall, R.H. 2005. Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. Accounting, Organizations and Society 30, 5, pp. 395-422.

Chenhall, R.H. & Morris, D. 1995. Organic decision and communication processes and management accounting systems in entrepreneurial and conservative business organizations. Omega International Journal of Management Science 23, 5, pp. 485-497.

Chiva, R. & Alegre, J. 2005. Organizational learning and organizational knowledge. Management Learning 36, 1, pp. 49-68.

Chow, C.W. & Van der Stede, W.A. 2006. The use and usefulness of non-financial performance measures. Management Accounting Quarterly 7, 3, pp. 1-8.

Coopey, J. 1995. The learning organization, power, politics and ideology. Management Learning 26, 2, pp. 193-213.

Crossan, M.M., Lane, H.W. & White, R.E. 1999. An organizational learning framework: From intuition to institution. Academy of Management Review 24, 3, pp. 522-537.

Cruz, I., Scapens, R.W. & Major, M. 2011. The localization of a global management control system. Accounting, Organizations and Society 36, 7, pp. 412-427.

Davis, S. & Albright, T. 2004. An investigation of the effect of balanced scorecard implementation on financial performance. Management Accounting Research 15, 2, pp. 135-153.

De Geuser , F., Mooraj, S. & Oyon, D. 2009. Does the balanced scorecard add value ? Empirical evidence on its effects on performance. European Accounting Review 18, 1, pp. 93-122.

De Haas, M. & Kleingeld, A. 1999. Multilevel design of performance measurement systems: Enhancing strategic dialogue throughout the organization. Management Accounting Research 10, pp. 233-261.

Decoene, V. & Bruggeman, W. 2006. Strategic alignment and middle-level managers' motivation in a balanced scorecard setting. International Journal of Operations & Production Management 26, 3-4, pp. 429-448.

Dent, J.F. 1990. Strategy, organization and control: some possibilities for accounting research. Accounting, Organizations and Society 15, 1-2, pp. 3-25.

Dervitsiotis, K.N. 2004. The design of performance measurement systems for management learning. Total Quality Management 15, 4, pp. 457-473.

DeVilbiss, C.E. 2006. Measurement design is an opportunity to learn. Leadership & Management in Engineering 6, 3, pp. 123-128.

Dixon, N. 1997. The hallways of learning. Organizational Dynamics 25, 4, pp. 23-34.

Dodgson, M. 1993. Organizational learning: a review of some literatures. Organization Studies 14, 3, pp. 375-394.

Dossi, A. & Patelli, L. 2010. You learn from what you measure: Financial and non-fnancial performance measures in multinational companies. Long Range Planning 43, 4, pp. 498-526.

Dougherty, D. & Hardy, C. 1996. Sustained product innovation in large mature organizations: overcoming innovation-to-organization problems. Academy of Management Journal 39, 5, pp. 1120-1153.

Easterby-Smith, M. 1997. Disciplines of organizational learning: contributions and critiques. Human Relations 50, 9. pp. 1085-1113.

Edmondson, A. & Moingeon, B. 1996. When to learn how and when to learn why: appropriate organizational learning processes as a source of competitive advantage. In Organizational Learning and Competitive Advantage. Sage, London, pp. 1-37.

Epstein, M.J. 2008. Making sustainability work: best practices in managing and measuring social and environmental impacts. Greenleaf, Sheffield. 272 p.

Ferreira, A. & Otley, D. 2009.The design and use of performance management systems: an extended framework for analysis. Management Accounting Research 20, 4, pp. 219-232.

Feurer, R. & Chaharbaghi, K. 1995a. Strategy formulation: a learning methodology. Benchmarking for Quality Management and Technology 2, 1, pp. 38-55.

Feurer, R. & Chaharbaghi, K. 1995b. Performance measurement in strategic change. Benchmarking for Quality Management & Technology 2, 2, pp. 64-83.

Fiol, C.M. & Lyles, M. 1985. Organizational learning. Academy of Management Review 10, 4, pp. 803-813.

Forza, C. & Salvador, F. 2000. Assessing some distinctive dimensions of performance feedback information in high performing plants. International Journal of Operations & Production Management 20, 3, pp. 359-385.

Franco-Santos, M., Lucianetti, L. & Bourne, M. 2012. Contemporary performance measurement systems: A review of their consequences and a framework for research. Management Accounting Research 23, 2, pp. 79-119.

Franco-Santos, M., Kennerley, M.P., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D. & Neely, A.D. 2007. Towards a definition of a business performance measurement system. International Journal of Operations and Production Management 27, 8, pp. 784-801.

Fried, A. 2010. Performance measurement systems and their relation to strategic learning: A case study in a software-developing organization. Critical Perspectives on Accounting 21, 2, pp. 118-133.

Gherardi, S. 1999. Learning as problem-driven or learning in the face of mystery? Organization Studies 20, 1, pp. 101-124.

Gherardi, S., Nicolini, D. & Odella, F. 1998. Toward a social understanding of how people learn in organizations. Management Learning 29, 3, pp. 273-297.

Godener, A. & Söderquist, K.E. 2004. Use and impact of performance measurement results in R&D: an exploratory study. R&D Management 34, 2, pp. 191-219.

Grafton, J., Lillis, A.M. & Widener, S.K. 2010. The role of performance measurement and evaluation in building organizational capabilities and performance. Accounting, Organizations and Society 35, 7, pp. 689-706.

Hall, M. 2011. Do comprehensive performance measurement systems help or hinder managers' mental model development? Management Accounting Research 22, 2, pp. 68-83.

Hall, M. 2008. The effect of comprehensive performance measurement systems on role clarity, psychological empowerment and managerial performance. Accounting, Organizations and Society 33, 2- 3, pp. 141-163.

Hamilton, S. & Chervany, N.L. 1981. Evaluating information system effectiveness – part I: comparing evaluation approaches. MIS Quarterly 5, 3, pp. 55-69.

Hedberg, B. 1981. How organizations learn and unlearn? In Nystrom, P.C. & Starbuck, W.H. Handbook of Organizational Design. London, Oxford University Press, pp. 8-27.

Henri, J-F. 2008. Taxonomy of performance measurement systems. Advances in Management Accounting 17, pp. 247-288.

Henri, J-F. 2006a. Organizational culture and performance measurement systems. Accounting, Organizations and Society 31, 1, pp. 77-103.

Henri, J-F. 2006b. Management control systems and strategy: A resource-based perspective. Accounting, Organizations and Society 31, 6, pp. 529-558.

Hoque, Z. & James, W. 2000. Linking balanced scorecard measures to size and market factors: impact on organizational performance. Journal of Management Accounting Research 12, 1, pp. 1-17.

Huber, G.P. 1991. Organizational learning: the contributing processes and the literatures. Organizational Sciences 2, 1, pp. 88-115.

Ilgen, N.B., Fisher, C.D. & Taylor, M.S. 1979. Consequences of individual feedback on behavior in organizations. Journal of Applied Psychology 64, 4, pp. 349-371.

Ittner, C.D., Larcker, D.F. & Randall, T. 2003. Performance implications of strategic performance measurement in financial services firm. Accounting, Organizations and Society 28, 7-8, pp. 715-741.

Jazayeri, M. & Scapens, R.W. 2008. The business values scorecard within BAE systems: the evolution of a performance measurement system. British Accounting Review 40, 1, pp. 48-70.

Johnston, R., Brignall, S. & Fitzgerald, L. 2002. 'Good enough' performance measurement: a trade-off between activity and action. Journal of the Operational Research Society 53, 3, pp. 256-262.

Jones, S.D., Buerkle, M., Hall, A., Rupp, L. & Matt, G. 1993. Work group performance measurement and feedback: an integrated comprehensive system for a manufacturing department. Group & Organization Studies 18, 3, pp. 269-291.

Kaplan, R.S. & Norton, D.P. 2001. Transforming the balanced scorecard from performance measurement to strategic management: Part I. Accounting Horizons 15, 1, pp. 87-104.

Kaplan, R.S. & Norton, D.P. 1996a. The balanced scorecard: translating strategy into action. Boston, Harvard Business School Press. 336 p.

Kaplan, R.S. & Norton, D.P. 1996. Stretegic learning and the balanced scorecard. Strategy and Leadership 24, 5, pp. 18-29.

Kasperskaya, J. & Tayles, M. 2013. The role of causal links in performance measurement models. Managerial Auditing Journal 28, 5, pp. 426-443.

Kim, D.H. 1993. The link between individual and organizational learning. Sloan Management Review Fall pp. 37-50.

Kleingeld, A.D., Tuijl, H.V. & Algera, J. 2004. A participation in the design of performance management systems: a quasi-experimental field study. Journal of Organizational Behavior 25, 7, pp. 831-851.

Kloot, L. 1997. Organizational learning and management control systems: responding to environmental change. Management Accounting Research 8, 1, pp. 47-73.

Kraus, K. & Lind, J. 2010. The impact of the corporate balanced scorecard on corporate control – a research note. Management Accounting Research 21, 4, pp. 265-277.

Lau, C.M. & Sholihin, M. 2005. Financial and non-financial performance measures: how do they affect job satisfaction? British Accounting Review 37, 4, pp. 389-413.

Lebas, M.J. 1995. Performance measurement and performance management. International Journal of Production Economics 41, 1-3, pp. 23-35.

Leitch, C., Harrison, R., Burgoyne, J. & Blantern, C. 1996. Learning organizations: the measurement of company performance. Journal of European Industrial Training 20, 1, pp. 31-44.

Lipe, M.G. & Salterio, S.E. 2002. A note on the judgmental effects of the balanced scorecard's information organization. Accounting, Organizations and Society 27, 6, pp. 531-540.

Lipe, M.G. & Salterio, S.E. 2000. The balanced scorecard: judgmental effects of common and unique performance measures. The Accounting Review 75, 3, pp. 283-298.

Mahama, H. 2006. Management control systems, cooperation and performance in strategic supply relationships: a survey in the mines. Management Accounting Research 17, 3, pp. 315-339.

Malina, M.A. & Selto, F.H. 2001. Communicating and controlling strategy: an empirical study of the effectiveness of the balanced scorecard. Journal of Management Accounting Research 13, 1, pp. 47-90.

Malmi, T. 2001. Balanced scorecards in Finnish companies: a research note. Management Accounting Research 12, 2, pp. 207-220.

March, J.G. 1991. Exploration and exploitation in organizational learning. Organization Science 2, 1, pp. 71-87.

Marginson, D.E.W. 2002. Management control systems and their effects on strategy formation at middle-management levels: evidence from a UK organization. Strategic Management Journal 23, 11, pp. 1019-1031.

Marquardt, M. & Reynolds, A. 1994. The global learning organization. Illinois, Irwin. 311 p.

Marquardt, M. & Waddill, D. 2004. The power of learning in action learning: a conceptual analysis of how the five schools of adult learning theories are incorporated within the practice of action learning. Action Learning: Research and Practice 1, 2, pp. 185-202.

Mausolff, C. 2004. Learning from feedback in performance measurement systems. Public Performance & Management Review, 28, 1, pp. 9-29.

Mazutis, D. & Slawinski, N. 2008. Leading organizational learning through authentic dialogue. Management Learning 39, 4, pp. 437-456.

McAfee, B., Quarstein, V. & Ardalan, A. 1995. The effect of discretion, outcome feedback and process feedback on employee job satisfaction. Industrial Management and Data Systems 95, 5, pp. 7-12.

Melnyk, S.A., Hanson, J.D. & Calantone, R.J. 2010. Hitting the target but missing the point: Resolving the paradox of strategic transition. Long Range Planning 43, 4, pp. 555-574.

Merriam, S.B. & Caffarella, R.S. 1999. Learning in adulthood: a comprehensive guide, 2nd ed. John Wiley & Sons, San Fransisco. 502 p.

Micheli, P. & Manzoni, J-F. 2010. Strategic performance measurement: Benefits, limitations and paradoxes. Long Range Planning 43, 4, pp. 465-476.

Miles, R.E., Snow, C.C., Meyer, A.D. & Coleman, H.J. 1978. Organizational strategy, structure and process. Academy of Management Review Jul, pp. 546-562.

Miller, D. 1993. The architecture of simplicity. Academy of Management Review 18, 1, pp. 116-138.

Modell, S. 2012. The politics of the balanced scorecard. Journal of Accounting & Organizational Change 8, 4, pp. 475-489.

Neely, A. & Al Najjar, M. 2006. Management learning not management control: The true role of performance measurement? California Management Review 48, 3, pp. 101-114.

Neely, A., Gregory, M. & Platts, K. 1995. Performance measurement system design: a literature review and research agenda. International Journal of Operations and Production Management 25, 12, pp. 1228-1263.

Nonaka, I. 1991. The knowledge-creating company. Harvard Business Review Nov-Dec. pp. 96-104.

Oliver, J. 2009. Continuous improvement: role of organizational learning mechanisms. International Journal of Quality & Reliability Management 26, 6, pp. 546-563.

Oswick, C., Anthony, P., Keenoy, T. & Mangham, I.L. 2000. A dialogic analysis of organizational learning- Journal of Management Studies 37, 6, pp. 887-901.

Otley, D.T. & Berry, A.J. 1980. Control, organization and accounting. Accounting, Organizations and Society 5, 2, pp. 231-244.

Ouchi, W.G. 1977. The relationship between organizational structure and organizational control. Administrative Science Quarterly 22, 1, pp. 95-113.

Parsons, J. 2007. Measuring to learn whilst learning to measure. Measuring Business Excellence 11, 1, pp. 12-19.

Phusavat, K., Anussornnitisarn, P., Helo, P. & Dwight, R. 2009. Performance measurement: roles and challenges. Industrial Management & Data Systems 109, 5, pp. 646-664.

Pinheiro de Lima, E., Gouvea da Costa, S.E., Angelis, J.J. & Munik, J. 2012. Performance measurement systems: A consensual analysis of their roles. International Journal of Production Economics 146, 2, pp. 524-542.

Riggs, J.L. 1983. Productivity by objectives. Prentice Hall, New York. 260 p.

Romme, G. & Dillen, R. 1997. Mapping the landscape of organizational learning. European Management Journal 15, 1, pp. 68-78.

Rompho, B. & Siengthai, S. 2012. Integrated performance measurement system for firm's human capital building. Journal of Intellectual Capital 13, 4, pp. 482-514.

Scott, T.W. & Tiessen, P. 1999. Performance measurement and managerial teams. Accounting, Organizations and Society 24, 3, pp. 263-285.

Senge, P.M. 1990. The fifth discipline: The art and practice of the learning organization. Century Business, New York. 423 p.

Shields, M.D., Deng, F.J. & Yutaka, K. 2000. The design and effects of control systems: tests of direct and indirect-effect models. Accounting, Organizations and Society 25, 2, pp. 185-202.

Simons, R. 2000. Performance measurement and control systems for implementing strategy. Prentice Hall. New Jersey. 792 p.

Simons, R. 1995a. Control in an age of empowerment. Harvard Business Review 67, 2, pp. 80-88.

Simons, R. 1995b. Levers of control: How managers use innovative control systems to drive strategic renewal. Harvard Business School Press, Boston. 232 p.

Simons, R. 1987. Accounting control systems and business strategy. Accounting, Organizations and Society 12, 4, pp. 357-374.

Sinclair, D. & Zairi, M. 1995. Performance measurement as an obstacle to TQM. The TQM Magazine 7, 2, pp. 42-45.

Srimai, S., Damsaman, D. & Bangchokdee, S. 2011. Performance measurement, organizational learning and strategic alignment: an exploratory study in Thai public sector. Measuring Business Excellence 15, 2, pp. 57-69.

Swart, J. & Harcup, J. 2012. 'If I learn do we learn?': The link between executive coaching and organizational learning. Management Learning 44, 4, pp. 337-354.

Teece, D.T. 1998. Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. California Management Review 40, 3, pp. 55-79.

Tranfield, D., Duberley, J., Smith, S., Musson, G. & Stokes, P. 2000. Organizational learning – it's just routine. Management Decision 38, 4, pp. 253-260.

Tsang, A.H.C, Jardine, A.K.S. & Kolodny, H. 1999. Measuring maintenance performance: a holistic approach. International Journal of Operations and Production Management 19, 7, pp. 691-715.

Tung, A., Baird, K. & Schoch, H.P. 2011. Factors influencing the effectiveness of performance measurement systems. International Journal of Operations & Production Management 31, 12, pp. 1287-1310.

Tuomela, T-S. 2005. The interplay of different levers of control: a case study of introducing a new performance measurement system. Management Accounting Research 16, 3, pp. 293-320.

Vaivio, J. 2004. Mobilizing local knowledge with 'provocative' non-financial measures. European Accounting Review 13, 1, pp. 39-71.

Van de Ven, A.H. 1986. Central problems in the management of innovation. Management Science 32, 5, pp. 590-607.

Van der Stede, W.A., Chow, C.W. & Lin, T.W. 2006. Strategy, choice of performance measures, and performance. Behavioral Research in Accounting 18, 1, pp. 185-205.

Vandenbosch, B. 1999. An empirical analysis of the associations between the use of executive support systems and perceived organizational competitiveness. Accounting, Organizations and Society 24, 1, pp. 77-92.

Vandenbosch, B. & Higgins, C.A. 1995. Executive support systems and learning: a model and empirical test. Journal of Management Information Systems 12, 2, pp. 99-130.

Widener 2007. An empirical analysis of the levers of control framework. Accounting, Organizations and Society 32, 7-8, pp. 757-788.

Wiersma, E. 2009. For which purposes do managers use balanced scorecards? An empirical study. Management Accounting Research 20, 4, pp. 239-251.